COAL AGE

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Never Again!

FRANKLIN SAID: *Resolve to perform what you ought.*
Perform without fail what you resolve.

THE time has come to sweep out the corners, brush down the cobwebs, oil the machinery and brighten the brass And this doesn't mean only engines and things made of steel, but rather the equipment of the human body.

What man is there who will start the new year without first taking an inventory of himself and then resolving to correct his faults? Every one of us knows some places where he has failed, and it's a poor sort of human who doesn't intend to make 1916 a better year than the one just closing.

If we lack health, there is one remedy that overtops all others—an orderly life. Yesterday we read the story of a great man who was given up to die when 40, but by eliminating bad habits and bad food he lived to be over 100 years old, having written a valuable book at the age of 83. When past 90, he said: "The food from which a man abstains after he has eaten heartily is of more benefit to him than that which he has eaten." How true it is !

Health is the first essential of success. Therefore our initial resolve should be to lead a temperate life. The story of the man referred to teaches that we can overcome physical handicaps at any age, provided we conquer ourselves and exercise absolute self-control.

After good health we need hope and ambition. There are no insurmountable walls of caste in America that prevent our reaching the highest offices in the land. Our greatest President was a rail-splitter. Our foremost merchant was clerking in a country store at the age of 18. Our most famous scientist, Thomas Edison, went to school but two months, having started to work when 11 years old. Edison said: "The majority of people are burning up one hundred horsepower of fuel in their bodies and taking out only eight horsepower of work."

No man's character will ever rise higher than his aims. If we are content to be nobody, we need not hope ever to be somebody. To succeed a man must be able to lose himself in his work. If a thing is not right, he must not do it; if it is not true, he must not say it. If he would command respect, he must command his temper. If he would attain independence, he must not forget that the best time to practice economy is before he has to. Last of all, he must remember that his companions are his mirror, for a fellow is known by the company he keeps.

For 1916

IN *making your resolves finally, be sure to record them and remember it's the* KEEPING *and not the "making" of good resolutions that is important in developing one's will and in shaping one's life.*

If you want to make 1916 the best year of your life, tabulate your worries and then proceed to determine what causes them. If you are not succeeding in your work, *write down why*. The chief idea is to *write it down*

When you have found out what the trouble is, don't act hastily. Spend a few days thinking it over and spend some of the time alone. The eagle is a great old bird, and one of his finest virtues is his ability to stand solitude.

Sealing Off Mine Fires*

By Joseph Cain†

SYNOPSIS—Fires usually originate at the working face. If they have gained headway, they may become inaccessible and must be sealed off. The construction of the seals as well as their ultimate removal requires great care and vigilance.

The following is a record of the methods used in overcoming no less than 23 mine fires which came within my personal experience and which required more than the ordinary agencies, water and dirt, to put out.

The last of the 23 happened as late as Aug. 2, 1915, and was, like the others referred to, extinguished without stopping the mine except in the district directly involved.

The fire of Aug. 2, 1915, started by the ignition of a gas feeder in the firing of shots in the advanced workings embracing five working places, namely, three entries and two crosscuts, 6 ft. high and between 10 and 12 ft. wide (see Fig. 1). It may here be explained that all places where shots are fired by regular shot firers are examined within two hours after shooting. The shot inspector on making his rounds travels with the intake current. Occasionally he crosses to the main return of any one district to note the conditions of the return air. On this occasion he found the odor of smoke that was not powder smoke and following up the return became fully assured that a fire existed.

His efforts to reach the fire having failed he hurried for help and advised the writer by 'phone. While a crew of workmen was being organized and preparations made for materials, we made a careful inspection of the trouble. We first tested the return at intervals, using safety lamps only. On reaching a point where smoke, fumes and heat became unbearable and it was unsafe to go farther, we decided to seal up the fire zone.

Only a Small Amount of Air Was Allowed to Reach the Fire

In the meantime we short-circuited quite a large portion of the intake current to prevent the entire volume of air reaching the fire. This would enable us to curtain off each of the working districts as near to the fire as possible, so as to prevent the smoke and fumes going to each of these districts and confine all the smoke to one return. We next hurried to the outside and other portions of the mine to obtain the necessary material for sealing. This material consisted of lumber, nails, ducking, tools, two kinds of clay, all available safety lamps, 75 ft. of rope and quite a quantity of drinking water. All material was taken in on the main intake side.

A watchman was placed at the fan and another at the first opening to the main return, so as to prevent anyone entering. The other employees were divided as follows: Two to get the lumber to the sealing location, one to procure the clay, one the water, one to mix the clay properly, two to saw the lumber to the desired lengths and two to prepare the place for the sealing. No naked lights were allowed at or near these places.

In the meantime a further inspection was made, the inspectors going as near to the fire as possible and testing the three openings leading to it, in order that the work of sealing should be done in the surest, safest and quickest manner possible. On the intake side we were able to reach a point near enough to hear the roaring, crackling sound of the fire; we were able to remain here but a moment.

To do this I, with the mine foreman 20 ft. behind, crawled on hands and knees under the smoke. We found the heat unbearable and unbreathable; the roof was falling in thick flakes and water dripping similar to a light rain. We found no showing of gas on the lamp, but we had to use care in handling this instrument to keep it from going out.

Further investigation proving fruitless we returned to seal up, beginning at the intake side. Fig. 1 shows the location, and Fig. 2 the plan and method of constructing

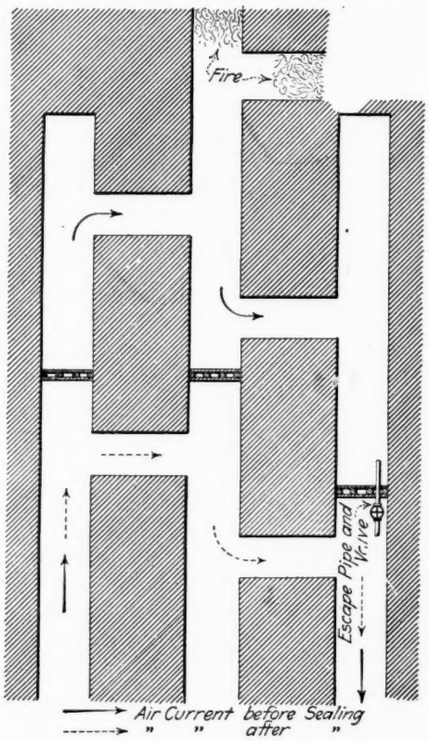

FIG. 1. SHOWING LOCATION OF FIRES AND THE THREE SEALS

the first seal. By this time we had ascertained the number of shots blasted and the approximate amount of loose coal exposed to the fire; thus we had a fairly definite idea of the extent of the trouble.

All Stoppings Are Similar in Construction

The stopping in the second opening to the fire was constructed like the first. In case of mine fires in general it is not always possible to secure readily 10x10-in. posts or 2-in. planks; hence we sometimes have to use 6x6-in. posts and 1-in. or 1½-in. planks. In the case of 1-in. planks we double over the walls, making sure to break joints at the cracks. In case 1½-in. planks are used we

*Paper read before the Kentucky Mining Institute, Dec. 3, 1915.

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batten the cracks on both sides of both walls with narrow 1-in. lumber. After a stopping is complete water is kept at hand to sprinkle the walls daily to keep the heat from cracking both the clay and the wood. In the event that there is a seepage of gas, this is easily detected by its odor and tendency to put the light out, when this is held near to the floor. If we cannot stop the leak by an additional layer of stiff clay, we proceed to dig out for and build up another wall with clay filling, tightly packed between the new and old walls.

In the construction of each seal we allow no more air to reach the workmen than is necessary to hold the smoke back. To gain time we start the second seal before we have completed the first. We have one man keep watch of the smoke, for if a fall of roof takes place at or near the fire, if the fan should stop or any disarrangement of the main intake current occur, the smoke would back out in spite of the fact that the return from this fire is yet open. The fact is a roof fall may occur at or near the fire, the sound of which may not reach the workmen as soon as the smoke, hence the necessity of one person watching for these disturbances.

In the case of the fire mentioned after completing the first and second seals with the exception of the plastering or finishing touches, we hurried to the third and last one. Here is where trouble and danger and all kinds of annoyances are met; here is where things happen that are more or less unexpected. No two fires act alike in the work of the last sealing, hence each man taking part in this work has to be on the alert. The most experienced man has nothing to do but watch and guide the others, if sick men or something worse is to be prevented.

A Difference of Opinion

Mining men differ as to which point should be sealed up last, but as stated in the beginning of this paper, from the experience of sealing up 23 fires and the fighting of 11 others which did not require sealing up, I firmly believe that the least evils are encountered by leaving the return side to be last sealed.

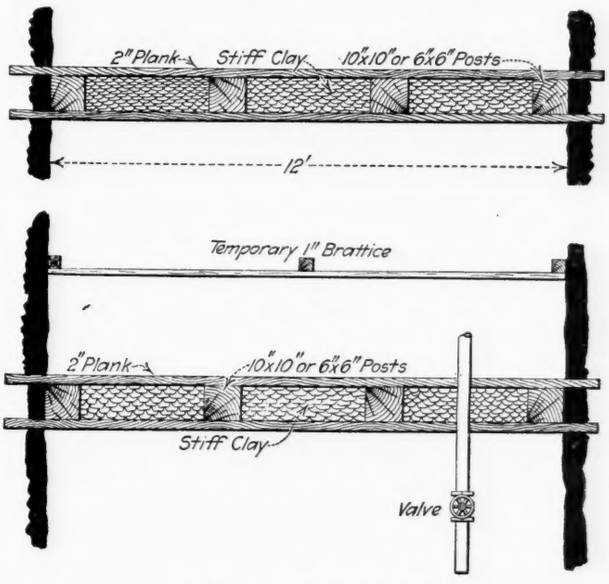
If, however, there are several openings to the fire to be closed and by oversight or delay the fire has made great headway or if a strong feeder of gas is the cause of such a fire and the sealing up is undertaken quite a distance back, I would seriously consider whether or not the return should be sealed up first.

The following points should be kept in mind when a fire occurs: Catch the fire as near to the time of its origin as possible; put it out by the direct method, if feasible and safe to do so; never allow a gas feeder of any size discharging its gas back of the advanced working face to continue to reach the working face, even though you may be able to dilute it with the air-current to a point below the explosive mixture. There may come a time when you will wish you had conducted it to the return direct from the fissure. Seal up as close to the fire as possible. Don't allow any more air at the place where the seal is to be made than is needed. Direct this air by brattice or curtains close around the workmen. Compel the men to do their work overhand and do not allow them to get their heads to the roof and inhale an overdose of smoke.

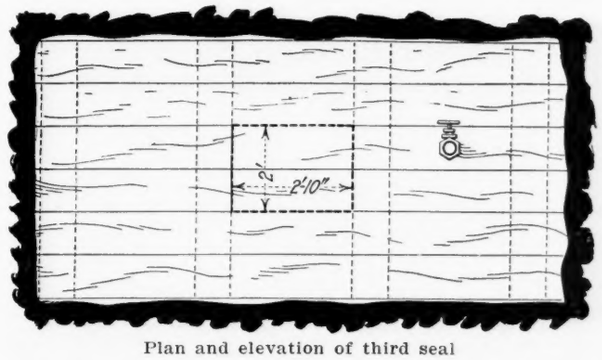
I have never yet thought it advisable to start sealing up the return from a fire first, for that would tend to make all sealing up places the return and, as stated above, erecting the last seal is a tough job which must be done with fresh men with their minds on the alert for danger. The man who has only read about sealing up a fire is likely to find himself in the wrong place.

Erecting the Seal in the Return

In erecting the last seal I proceed about as follows: Have everything ready and handy. Run up a frame curtain or rough brattice on the inby side of the complete sealing location; try to keep the smoke back (this is a difficult job) in one way or another to help the workmen. Work about two men for 15 min. at a time; run the main seal up in sections from the bottom upward; run up both partitions simultaneously, the clay wall included. Pack



Plan of first and second seals



Plan and elevation of third seal

FIG. 2. CONSTRUCTION OF THE THREE SEALS

the stiff clay tight with pressure; have a stick in your hand to tap the first man who raises his head too high into the thick smoke. Insert the escape pipe with valve and locate it to one side and one-third or halfway above the floor (see Fig. 3).

When every place leading to the fire is sealed, remove all check affecting ventilation to this point, allowing the largest available amount of air to pass through the open breakthroughs and to all working places, so as to sweep out all smoke and gases that may have reached these points during the time the air has been restricted in them. In due time inspect all places to see whether O. K. and fit to work.

Near the return seal where the escape valve and pipe are located, an easily constructed brattice or curtain with a small door made of ducking or canvas is put up in front of the pipe so as to be able to test the gas coming from the fire area. This test may be made every evening after all workmen have left the mine.

With the curtain door down and the valve partly open, test the place as you test for gas. The fact is you will find no gas to show a cap for the first three or four days, but on bringing your lamp down to the floor near the end of the pipe you will find a gas that will put out the light at once. This will be found for three or four days. About the fourth day you can get a cap showing on your lamp. This showing will get stronger each day, and during the night, while no one is at work on the return side, you will leave the valve open for several hours. The showing of gas will become stronger from day to day, finally developing a cap on the lamp when held some distance from the pipe.

The Gas Shows When the Fire Is Out

From the indication of the gas from the pipe you can determine when it is proper to open the sealed area. In my experience, with one exception, 17 days was sufficient to smother the fire. In one case it was not out and we had to close it up again. This was because in this case we had to do our sealing some 500 ft. back from the fire, hence we closed in considerable air which supported combustion. In unsealing it is my experience that it is best to proceed as follows: We curtain off all other districts so as to prevent the escaping gases from reaching them and to confine the return from the fire to one aircourse, so that an inspection may be made. We then close up the crosscut brattice, leaving a curtained manhole 3x4 ft. The four thicknesses of curtain are held up until we quickly knock out a 34x24-in. opening. There must be no lights, not even a safety lamp, in line with this return, even though a full air current is passing nearby. One man is left to complete the opening in this seal.

As soon as the 34x24-in. opening is made we proceed to the first or intake, seal. The 3x4-ft. four-thickness curtain is dropped down over the opening in the crosscut. The air current then passes through to the heretofore closed-up fire area.

With the air current connection now made certain we leave this district, placing one man with a safety lamp at the first easy opening to the return, or about 400 ft. outward. Another man is stationed at a similar place and distance outward, as is also a third, while the fourth man passes along this distance and takes the record of the tests now made in this return from each man. The lamp test in each case is made with great care and at intervals of 10 to 15 min.

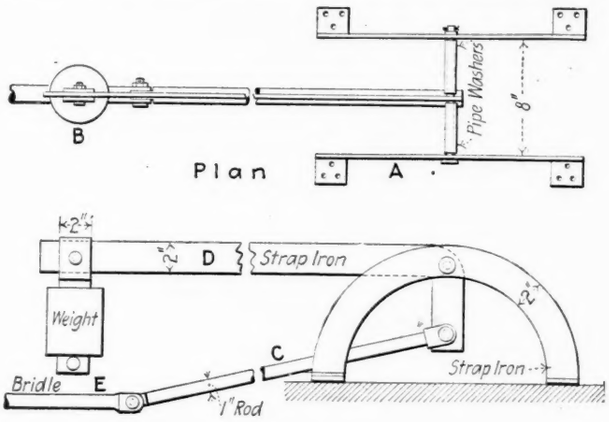
In the case of the fire above mentioned our findings were about as follows: It should be remembered that some 7,000 cu.ft. of air was passing through the fire area per minute with almost a direct return to the fan at each place. When making a test, a man unavoidably allowed a small quantity of the intake to bypass, correspondingly lessening the amount passing through the opened up seal. For the first 65 min. the gas in the return was strong enough to show a quick sharp cap even near the floor, often so quick that it would put the light out before the lamp could be removed. In making the first test it was no trouble to get a cap on the flame for a full 45 min., even on the bottom. After this time had passed no showing of gas was possible. In due time two of us traveled the return as far as the return seal. We then went through the seal on the intake side, making a full inspection as far as the fallen roof would allow.

The opening and places on the intake side as well as the return on last sealing side were not seriously damaged by fallen roof, but the center opening was much damaged, roof having fallen nearly roof high. Nowhere were we able to reach or see the burned coal until we had removed, through several hours' work, considerable fallen roof.

A Weight-Operated Switch

The accompanying drawing shows a weight-operated switch, which is a good substitute for the ordinary device of this kind, which is spring-operated. Being simple in construction, it can be made by any mine blacksmith. It is reliable in operation and will work successfully on any passway or sidetrack where a device of this kind is required.

As may be seen in the drawing, the bridle bar *E* is joined to the connecting rod *C*, which is attached to the



DETAILS OF THE SWITCH-OPERATING MECHANISM

bell crank *D*, which pivots between the quadrants *A*. On the horizontal end of the bell crank is attached the weight *B*. It will be thus seen that the weight *B* exerts a continuous force on the bridle bar in a manner exactly similar to the spring on the ordinary switch.

In installing this switch care should be taken to set the quadrant *A* sufficiently away from the track, so that the weight *B* may readily clear the motor and trucks. The rod *C* must therefore be somewhat longer than the long arm of the bell crank *D*.

Safety First

Study your plant.
Attend to business.
Fear your own temper.
Earn your salary.
Teach others.
Yield to good counsel.

Foresee events.
Investigate all troubles.
Read uptodate literature.
Sweat.
Think.

Future Mining Plants From the Engineer's Standpoint*

By O. G. Petersen†

SYNOPSIS—The keynote of future installations will be simplicity. The elimination of all unnecessary appliances and particularly the avoidance of superfluous parts in necessary equipment will do much to lessen the cost of the mine output as well as increase the safety of the operative.

The word simplification will express the trend of all mining plants of the future. The consistent application of this idea to the plant as a whole, and more particularly to the component parts, will bring results in continuity of operation, cheapness of product and what is becoming daily more imperative than either, freedom from accident to operatives.

As one visits various sections of the country, attempts at individual improvement by cutting out some unnecessary step are to be noticed. But to go at the problem boldly, to ruthlessly cut out beautifully running wheels flashing steel shafts and other swiftly moving whirligigs that go so far to make the plant look as though it were doing something, takes courage above the ordinary.

Let us not at once assume that a simple plant is consequently a cheap one in first installation costs. The very process of cutting out numberless inconsequential members brings one's attention to weaknesses in the fundamental outline calling for increase of strength at those points.

Looking at a plant from a combined investment and operating standpoint, say total investment and operating costs for a period of 20 yr., the simple, sturdy plant rises head and shoulders above the others.

The most direct way of bringing out the points stated will be to outline in brief terms the essential features of a mining plant for producing from 1,000 to 3,000 tons per day, with particular reference to the mining conditions found in most regions of Kentucky and adjacent territory.

I believe it is generally agreed that central power for mining-plant operation is the first pronounced step toward the simplification of such an equipment.

Power Unpurchasable Must Be Generated

An operation so situated that it cannot purchase power from the central station will have to do the next best thing, namely, operate its own power plant. By adopting some well-tried but little-used principles, the operator can not only generate remarkably cheap power, but simultaneously increase the market value of his product in a surprising manner. We have all realized most keenly to what bottomless depths the price of nut and slack fell during the past spring and summer. By the simple process of using equipment to consume all of the dust and screenings passing through a ¼-in. circular perforation we immediately prepare a product that is welcomed in the general fuel market.

To begin with power plant boilers of the most rugged design should be installed, with steam pressures not less than 150 lb. and preferably 200 to 250 lb. The dust and fine coal should be brought from the screens by means of a conveyor, pulverized to an impalpable dust, mixed with the proper proportion of air and burned under the boilers exactly as gas is. This immediately removes stoker investment and repair charges. Through means recently perfected, fire-brick trouble incident to gas firing has been entirely eliminated. Removal of ashes from the boilers should be through a compartment entirely separated from the boiler room, and where the situation permits, the ash-removal apparatus should consist of nothing but a stream of water flowing in a concrete trough.

The boilers should be fed by means of turbine pumps. The steam piping should be of the simplest and most direct type, and the turbines of the noncondensing variety driving alternating-current generators. To keep the operating force to a minimum the boilers and turbines should be installed in a single room without any partitions whatever.

Coal Should Be Received Without Breakage

The coal preparation plant should be of a type receiving without breakage from nine cars that need to be neither uncoupled nor stopped for weighing or dumping. In other words it shall be a type in which there is no tipple crew and in which all operations of weighing, dumping and recording of weights are accomplished by the simple act of having the haulage motor pull the trip of mine cars across the tipple.

Other features of coal preparation and loading, such as a screen capable of producing any size that the market in any section of the country may demand without stoppage or interruption for changing from one size to another, the rescreening of the larger sizes after the first separation has been accomplished, the lowering of the sized coal to the car without breakage, the control of the movement of the railroad cars under the tipple—all these are too well established to require special comment.

Coming now to the matter of haulage and a consideration of the dangers arising from bare conductors, both trolley and power wires, particularly in mines operating in a low coal measure, the wonderful improvement of the past two years in storage-battery haulage equipment seems to point ultimately to the adoption of this system for all handling of mine cars, be it in the placing and gathering of the individual car at the room or the haulage of the assembled train to the tipple.

In the distribution of power inside the mines, whether for ventilating, pumping or the operation of coal cutters, the double idea of continuity of operation and absolute freedom from contact with live conductors seems to point to lead-covered cable protected by a steel conduit, the latter being laid alongside the mine tracks. At once all delays owing to poorly put-up hangers, insulators falling on account of soft top and conductors knocked

*Paper read before the Kentucky Mining Institute, Dec. 4, 1915.

†Associated Engineering Co., Somerset, Ky.

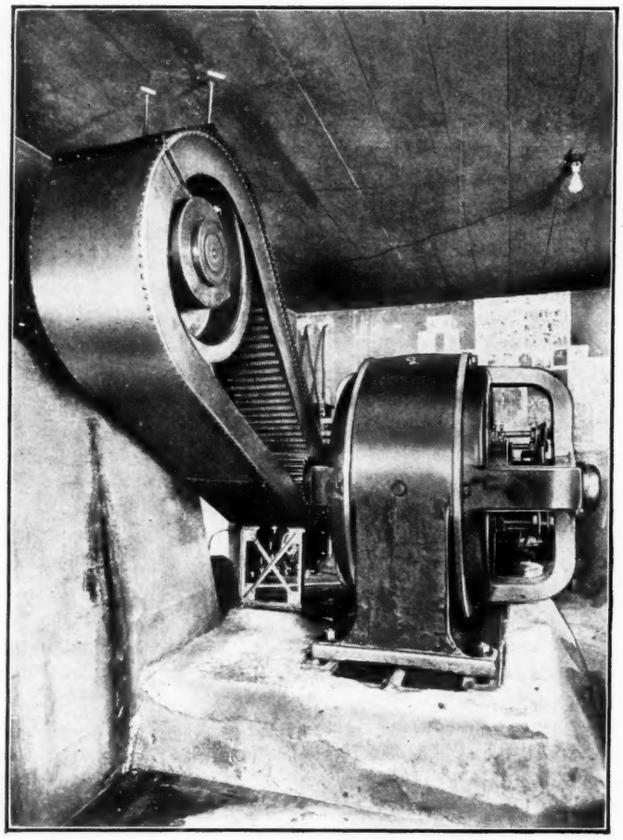
down by falling slate are eliminated. The steel conduit will prevent accidental cutting of cable and consequent electrical troubles.

In the matter of undercutting coal, with the heavy investments for repair parts which must be carried in stock, there is not an operator living who has not dreamed of the day when someone would develop a machine for undercutting coal which shall not have more than one moving member and of such weight that it can be easily taken about the mines and operated at the face by one man.

To put the whole matter in a nutshell: The mine having the fewest mechanical and electrical devices, and each device consisting of the least number of parts, all consistent with labor and output conditions, will be the goal we are striving to attain.

Silent Chains in Ventilation

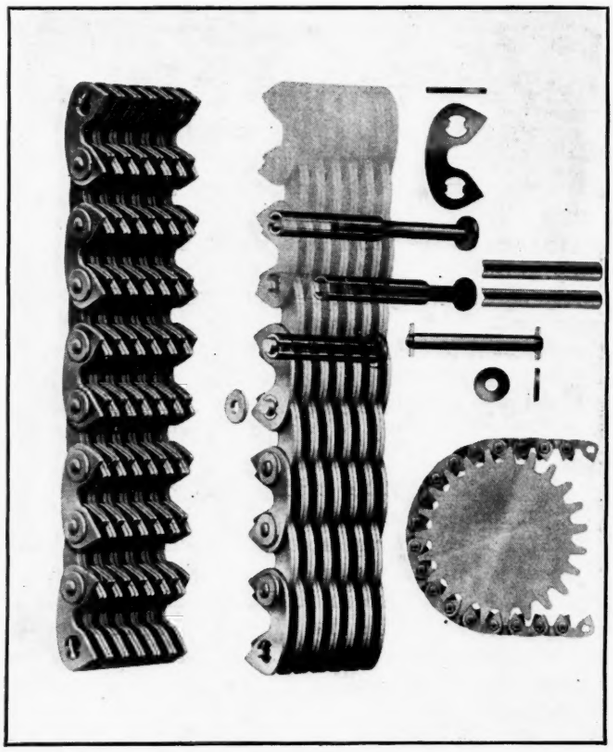
One of the major ideas in modern mining is safety. To attain this end, particularly in coal mining, careful attention must be given to adequate ventilation. Fans and motors were long ago brought to a high state of development, but only within comparatively recent years has careful attention been given to simple, positive, reliable and efficient means of transmitting power between the fan shaft and the shaft of the machine that drives it.



A SILENT-CHAIN FAN DRIVE

Where no change of speed is necessary between the two shafts, a flexible coupling is the simplest and most satisfactory connection. Where the rapidity of rotation of the two shafts is necessarily different, few if any means for transmitting motion exceed the silent chain in simplicity, reliability and positiveness of action.

The silent chain drive as built and sold by the Link-Belt Co., of Chicago, Indianapolis and Philadelphia combines the positiveness and reliability of the spur gear with the flexibility of the sprocket chain. Each drive consists of two cut-tooth sprockets and a carefully constructed steel-link chain. The sprockets are formed and finished by special cutters so that the contour of the teeth will operate to best advantage with the links of the chain and so that sliding, with its unavoidable frictional losses, is reduced to a minimum.



DETAILS OF SILENT-CHAIN CONSTRUCTION

The joints in the chain are made of case-hardened steel pins and semicircular case-hardened steel bushings keyed in the eyes of the links and extending the full width of the chain. This gives an unbroken bearing surface for the full pin length. Long life is assured in a joint of this construction by the area and character of the bearing surfaces. Furthermore, since the links are symmetrical in design, the chain will run equally well in either direction. Additional wearing value is thus secured.

The silent chain is highly efficient, tests having shown as high as 98 per cent. This high efficiency results from the fact that there is no movement of the links relative to the teeth when contact has once been made between them, each portion of the links running at the same speed as the part of the sprocket with which it is in contact.

Because of the entire absence of sliding or rolling action between the links and sprockets, there is also none of the objectionable noise usually accompanying the use of spur gearing, particularly at high speeds.

A drive of this character may be operated with a slack chain. This obviates undue journal friction incident to the use of belts or rope drives and results in decreased friction and a considerable saving in power.

West Virginia Coal Institute

SYNOPSIS—A successful meeting at which nine interesting papers were read was held in Fairmont, W. Va., on Dec. 8 and 9.

The West Virginia Coal Mining Institute held its sixteenth semiannual meeting in the assembly room of the Watson Building, Fairmont, W. Va., on Wednesday, Dec. 8, and Thursday, Dec. 9. On the first day about 50 persons were present and on the second about 100 attended.

The meeting opened at 10 a.m. on Wednesday with a paper by R. Z. Virgin, of Colliers, W. Va., on "The Relation of Mine Officials to the Consumer." Mr. Virgin pointed out that the mine officials and miners were in the end working for the consumer who paid for the coal rather than for the operator who was really merely a middleman. It was necessary to supply the consumer with good coal if orders were to come in steadily.

In the discussion he said that leaky railroad cars for the transportation of slack should not be made tight by the use of props or planks, which make unloading difficult, but rather with paper and excelsior. The company store at his mines being near the loading point, the loaders could easily obtain the material for making the cars tight. J. C. McKinley instanced one mine where hay was used for this purpose at $21 per ton, whereas straw at $6 would have served the purpose equally well.

The next paper was by J. R. Cameron, of Cincinnati, Ohio, and was entitled "Why Buy a Storage-Battery Locomotive?" Mr. Cameron was "neutral in thought and speech" and left the hearers to draw their own conclusions.

A discussion then took place as to whose duty it was to take care of water when the owner of a lower property got over the line and drained the dipping working of the man who owned the adjacent higher property. The matter was really more one for lawyers than for a body of engineers and other mine officials, so no answer was forthcoming.

Provisions of Compensation Act Discussed

The matter of workmen's compensation then received some consideration. It is necessary for the physician, the operator and the injured man to file affidavits testifying to any accident. In some cases ignorant men failed to make their statements, partly because of their illiteracy, partly because they did not realize the necessity, partly from inability to declare the nature of their accident and more often because a notary public was hard to secure. In many cases the men were too severely hurt to travel to the notary and too poor to pay one for making a trip to the bedside in the mining village. Thus the claim was not satisfactorily filed. Some operators, J. B. Hanford, of the Elkins Coal and Coke Co., among them, had provided for this difficulty since the law had gone into effect by securing notarial powers for someone residing in the mining village.

R. Z. Virgin, a superintendent of the West Virginia-Pittsburgh Coal Co., at Colliers, W. Va., said that the present system of not making partial payments is unfair to the workingman. It is not right to leave the compensation unpaid until the man returns to the mine. Such a long delay means one of two things—either the company must advance the money and run a risk of losing it or else the man will starve.

In the afternoon R. J. Beaman, of Cincinnati, Ohio, read a paper on "Uniform Accounting and Cost Records as Applied to Mining." I. C. White, the former state geologist, declared that the individuals of the Federal Trade Commission had decided in favor of uniform accounting for all coal companies doing an interstate business; that is, mining coal in one state and marketing all or a part of it in another. The commission had, he declared, the power to demand this uniformity in the keeping of accounts, but it would rely on moral suasion. It would supply experts to aid in the conversion of the accounts to the new basis, not charging anything for the service except the actual expenses incurred by the experts.

Some Concerns Do Not Know Costs Within 50c.

Some concerns, he said, had such a loose way of figuring mining costs that they did not know within 25c. or 50c. what was the real cost of their coal at the tipple. They overlooked entirely depletion, depreciation, obsolescence, the life limit of the mine, the loss due to accidents and the hazards of the industry, thus blindly basing the cost on the payroll expense. He urged that a knowledge of the real costs would make the operator more careful to sell always at a price that would yield him an assured return.

Under the head of depreciation due to the industry the author of the article brought out the fact that a plant which was established and capable of continuing in operation might well become inoperable because the haul would become so great. The machinery and the heading work might continue to have an ability to handle coal, but it would be necessary to sell or transfer the first and close down the second because coal could no longer be handled at a profit.

J. B. Hanford wanted to know what that haulage limit was. He was of the opinion that his hauls, from an economic standpoint, were constantly getting shorter. In the earlier days of the mine the equipment, both of track and motive power, was so inferior that the cost of haulage was really higher than he could secure, now that he had laid his main haulages with 60 lb. rails and had installed new equipment which would handle the tonnage with much greater facility.

W. E. Fohl, of Pittsburgh, thought that the haulage did not determine the "cruising radius" of the mine. This was determined by the acreage with which the operator felt able to burden himself rather than on the length of haul. The coal-mine owner could not profitably pay interest and taxes and expend the money for testing more than a certain territory of coal for any single operation. So the depreciation described as due to the industry was due always rather to the restricting action of acreage than to the limitations on a profitable coal haul.

Mr. Fohl also suggested that it would be well if a committee was formed in every district to discover the exact cost of mining coal at all the mines in the district. These results could be tabulated, the various statements, however, of the companies supplying the information being kept

entirely secret. In this way the members of any one district would know what was the safe and sane price to charge for a ton of coal.

Several members thought that any system of accounting which failed entirely to consider the increase in the value of coal land led to incorrect assessment of costs. They said that many mines might keep accounts as Mr. Beaman proposed and might figure they were selling at a loss, whereas as a whole they would be doing well, for the coal in the hill, while depleted in quantity by mining, would be growing in value by reason of the increase in the selling price of what remained. This Mr. Beaman regarded as a change in speculative rather than in investment value.

It was pointed out that if two men had tracts of equal value, and one man had bought his coal years ago at $5 per acre and another recently at $150, the two men figuring the cost of production by Mr. Beaman's method would arrive at entirely different results and would probably sell at very discrepant prices. It seemed advisable to figure depletion rates at present coal values and not at purchasing value.

Some, however, disregarding depletion since it is balanced by increased values, took an entirely opposite point of view. They argued that the production costs could be figured as helped by the progressive increment in the value of the coal remaining, thus justifying a lower selling price, a point of view diametrically opposed to the ideas of those who think that the increased value should be correctly mirrored in higher production costs.

Depletion Charge Not to Be Ignored

But evidently this last view is wrong, because better than selling for a price which would not allow for depletion an operator would do well to shut down entirely and gain his increment not only on the unmined reserves but on the coal which, if he had been working, he would have mined.

J. B. Hanford declared that at his mines the depletion on coal land was figured at its actual cost plus the interest, the taxes from the date of purchase and the drilling expense. Thus the depletion charge, far from being constant, varied with the particular area mined.

R. D. Hall said that the accountants when considering the value of a new plant figured only the labor and material put into it and did not allow interest for the period of installation. A shaft that took a year to build should be carried on the books at cost plus a half-year's interest even if sunk by the owner. It was worth no less if he built it than it would be had a contractor sunk it, and such a contractor would look to draw interest on the period of construction, though it would appear probably not as a stated item. It would certainly be in the mind of the bidder and would appear unquestionably on his private cost sheet if he had to wait for the completion of the job before he drew his pay.

Mr. Beaman contended, as accountants do, that nothing may be shown on the books but payments actually made. If interest on bonds were paid, then this interest could be entered without violence to correct accounting rules.

Mr. Hall also said that the depreciation might well be considered as starting from the completion of the job, for any depreciation of the material used in sinking a shaft would be charged by the contractor as part of the cost of sinking, and the timber in the shaft would inevitably be paid for by the operator as if it were newly installed. Of course the remaining life of the material incorporated in the shaft or merely used in the work of its construction would be less than if it had just been put in. If its economic life was 20 years, whatever had been in, say a year, would have to be depreciated not 5 per cent., but as if it would be valueless or have a junk value after 19 years.

Greer Submits System of Mining by Panels

G. E. Greer, of Morgantown, read a paper on "Projecting a Mine on the Panel System." The main criticism was that the long period and large cost needed for full development was prohibitive for a small capitalist or where the union demanded a big differential for narrow work. This argument was advanced by Joseph Virgin, mine superintendent of the Mound City Coal Co., Moundsville, W. Va.

Another critic advocated wing pillars twice as big as the 100-ft. pillars shown and also that the chain pillars be reduced to 15 ft. C. H. Tarleton and A. W. Hesse said that the Consolidation Coal Co., which had at one time favored a 25-ft. chain pillar, had recently tried 35-ft. pillars. In advancing the narrow pillar served every necessary end, but in retreat if there was a squeeze, a 25-ft. pillar could not be split and coal was almost inevitably lost. Mr. Tarleton was not prepared to say that the larger pillar would give satisfaction.

The report of the secretary showed the usual impecuniousness of mining institute funds. The cash on hand was $21.20; the debts were $102. So the balance was against the association to the extent of $80.80. The secretary reported that the bulletin was discontinued as it seemed to put too heavy a strain on the institute finances.

The election followed. W. H. Cunningham proposed that J. C. McKinley act during a second term as president, and he was elected unanimously. E. N. Zern proposed and lobbied for Karl Schoew as secretary-treasurer, but after a ballot he was induced to accept reëlection himself. The vice-presidents will be J. W. Bischoff, manager, Davis Colliery Co.; Josiah Keely, manager, Cabin Creek Consolidated Coal Co., Kayford, W. Va.; George Watson, vice-president, Consolidation Coal Co., Fairmont, W. Va.; Karl Schoew, consulting engineer, Huntington, W. Va.; J. R. Cameron, of the Goodman Manufacturing Co., Chicago, Ill. At the request of the burgess of Bluefield, W. Va., it was arranged that the next meeting would be held in that city.

On the second day, Dec. 9, J. W. Bischoff's paper entitled "Some Suggestions and Ideas Based on Observation" was read by the secretary, E. N. Zern. In the discussion of this paper it was urged that the shortage of labor might be met by greater efficiency. Unfortunately, too much of the waste of labor, according to the speaker, was owing to the fact that there was nothing in the mining contract to reward the operator for all he might do to make the mining and loading of coal move steadily and without friction.

Prompt supply of mine cars, timely cleaning up of coal shot down and undercutting on a regular schedule were necessary for the efficiency of the miners at their work, but as the operator had little interest in the productivity of the miners, it was hard to induce him to expend time and money to provide for the regular operation of cutters and loaders. A mingling of the time and

day wage was urged as a solution, the time wage being a minimum payment. The output would then be paid for as at present, but at a lower rate.

It was suggested that a larger tonnage would be made per man if the older breast machines were replaced by shortwall cutters. But this would not be made general till the operator could feel assured of an income from the change. He could hardly be expected to scrap his old machines and buy new ones solely because the change would enable the miner and loader to earn a larger wage.

The speaker who urged this mingling of time and output wage met nothing but opposition. Josiah Keely said that if it were not for the probability that mules would be killed in the wild rush for tonnage, he would advise putting all the drivers on a tonnage basis, so as to give them an interest in their day's work. Joseph Virgin said he would like to see everybody on piece work, as output wages made supervision less necessary, while J. C. McKinley urged that even the mine foremen would do better if paid at least partly by a bonus, and he reported that he had been successful in introducing the bonus system for efficient mine foremen at his mines.

In opposition to what had been said he believed that it had been generally found that additional bosses would increase tonnage and so give a larger output to pass over one tipple and make operation generally more efficient than it would otherwise be.

Product of Breast and Shortwall Cutters

He declared that it was true that the miner gained much direct benefit from the replacement of the breast machine by the shortwall, which latter he estimated did 50 per cent. more work than the former.

C. H. Tarleton stated that the Consolidation Coal Co. in West Virginia was unable to show a difference of 50 per cent. between breast and shortwall machines, no matter who ran them. J. R. Cameron said that the output was often determined largely by custom and not by the capabilities of the machine.

Josiah Keely was surprised at Mr. Tarleton's statement, for he had found that the shortwall machine cut twice as much as the breast machine in an ordinary room. He really was surprised that the Consolidation Coal Co. could not get as favorable a result when cutting the Pittsburgh bed, which he regarded as not in any way harder than the splint bed in the Cabin Creek district.

G. A. Burrell then demonstrated his portable gas detector. It is really in the borderland between an indicator and an analyzer. It consists essentially of a U-tube partially filled with water, the end of one tube being provided with a rubber mouthpiece. The fireboss or inspector blows into that end, and as a result the other limb is filled with water. As soon as the operative ceases to blow into one limb, the water falls to a balancing position, causing a vacuum in the other. This vacuum is filled by the atmosphere of the mine.

In the limb thus filled with gas a platinum wire has been introduced. This is caused to glow for 2 min. by the electric current generated by two Eveready cells incorporated in the base of the instrument. This burns the methane in the mixture, causing a partial vacuum which the water rises to fill. The movement of the water thus caused is a measure of the gas burned. Of course the temperature is raised somewhat, and the apparatus must be shaken to reduce the mine air and combustion products in the graduated limb to the temperature of the water used.

Mr. Burrell, on being questioned, said that each cell cost about 6½c. and a pair would serve for over 20 determinations. The whole instrument made in quantities should not cost more than $5, and the platinum should serve for several hundred indications. The detector will measure methane down to 0.1 per cent., and the limb is graduated to 4 per cent. The upper range may be extended if the actual percentage of methane is not sought, the observer being only anxious to determine the presence of the gas in large quantity. Air containing 5½ to 14 per cent. of methane will explode and so show that methane is present in some unknown proportion. Above that percentage the methane will not burn. The explosion is not to be dreaded, as the violence is small and is cushioned by the water. A few fine drops of fluid are thrown out, and that is all the damage done.

In answer to an inquiry as to the means of ascertaining whether the combustion limb of the tube was completely filled prior to admitting the measured quantity of mine air, Mr. Burrell said that the operative should blow until he heard a click which evidenced that the limb of the tube was full. The instrument would give practically unaltered results if ethane constituted as much as 15 per cent. of the combustile gas admixture.

An Accurate Instrument for Untrained Men

The water must be maintained at a certain marked level, so that the graduated limb will contain 2 cu.in. of air when the water is at the same level in both limbs. There is not enough carbon dioxide dissolved to affect the result. The small quantity present makes such absorption negligible. Mr. Burrell claimed that the new detector could test eight samples in the time needed to make one Hesse test.

The sample having been taken by blowing and allowing the water to fall, the operative could cause the platinum to burn the gas while he was passing to another place. He could examine the instrument and take his record just before preparing to take another sample. However, J. Virgin contended that even under those operating conditions a mine would have to employ four firebosses where one is now engaged, if the requirement that examinations be made within three hours of the miners' entering their working places was to be strictly maintained.

Frank Haas, the consulting engineer of the Consolidation Coal Co., declared that he looked with much favor on the innovation. His company was using a method involving the taking of flasks into the mine and thus securing samples. The new method was far prompter and made it possible to ascertain present conditions rather than those existing some few hours before. He believed the method of great value in determining the character of the air in the return airways as far as combustible gas was concerned.

It was the custom of the Consolidation Coal Co. to estimate methane to 0.01 per cent., not because it was valuable to know how much combustible gas was present to such a degree of nicety, but because it was important to find whether the degree of methanization was increasing or decreasing. The company does not tolerate more than 0.25 per cent. of combustible gas in any of the return airways of its mines.

Someone made the statement that ½ per cent. of "gas" could be detected by the Wolf lamp. J. L. Ryan declared is was possible, but not practical. When there is over 1 per cent. of gas present, the trained observer can guess the quantity within ¼ per cent., but there are a great number of men who will be oblivious to the presence of gas in the lamp till 3 per cent. is reached.

G. S. Brackett's paper on "Day Labor in Bituminous Mines" followed, but failed to draw discussion because such a mass of figures can be analyzed and appreciated only in the privacy of the study.

Mine Depletion and Depreciation Estimates

J. B. Hanford rose to vindicate the methods of his company, the Elkins Coal and Coke Co. He certainly could not allow his company to be associated in a group with those which kept such poor records of expense that the cost could not be determined within 25c. or 50c. per ton, as stated by I. C. White of many unnamed companies in his statement of the previous day.

Punctilious though the record of the Elkins Coal and Coke Co. is, the depletion and depreciation is only figured annually and not monthly, as J. C. McKinley advocated. It is not well to run for a whole year and then repent at leisure when a report exhibiting all the cost entailed is for the first time presented.

The discussion drifted naturally to the percentages allowable for depreciation. C. H. Tarleton declared that copper was by no means of such long life as was generally thought. For while it did not lose by friction or oxidation, its occasional contacts with coal, roof and floor caused short-circuits resulting in its depreciation and depletion in weight, and it soon hardened till it became too brittle for use.

He considered it an open question whether light rail and all copper should be credited to equipment or charged direct to operative expense. Rail in wet places suffered rapid oxidation, and both C. H. Tarleton and J. B. Hanford urged that regarding rail as one of the direct operating charges prevented the foremen from wasteful requisitioning and lack of care of the material furnished.

Mr. Hanford said there was a large loss from cutting rail to pieces and from bending. Much loss from crystallizing also results. Much rail that is giving excellent service in a wet place will prove utterly unfit when lifted and spiked onto other ties. It was also said that many of the rerolled rails prove to have a rapid deterioration. The ball of the rail falls, and the web turns down. It was urged that billet rails be kept separate from those rerolled, for they alone are suited to switch work.

E. B. Day recalled the opinion delivered at a previous meeting that some cutting machines depreciated about 25 per cent. in the first year, but less could be deducted for this cause in succeeding years.

It was decided to hold the meeting next winter in Huntington, W. Va., and to invite the Kentucky Mining Institute to participate. At the closing of the morning's business several visited the Consolidated Coal Co.'s laboratory in the basement of the assembly building.

The afternoon session comprised an address on "Welfare Engineering as Applied to Coal Mines" by W. F. Hyde, of Wheeling, W. Va., and "Needed Reforms in the Coal Mining Industry" by K. F. Schoew, a consulting engineer of Huntington, W. Va.

At the evening session, over which J. C. McKinley also presided, Governor H. D. Hatfield was the principal speaker. Judge W. S. Haymond, of Fairmont, made the opening speech. The Governor flayed the operators for attacks on his administration and defended himself against the charge of being disloyal to the coal industry of his state. At the conclusion of the speech the Governor, probably because he was Governor, received much applause. Those who heard the speech of Governor Brumbaugh of Pennsylvania before the National Safety Council in Philadelphia would naturally contrast that humanitarian appeal with the exasperating remarks of the West Virginia Governor. It would be better for Governor Hatfield and his state if he would seek to lead and not try to drive. J. C. McKinley, the president of the institute, closed with a paper which did him and the institute much credit.

Mine-Car Resistance

By E. B. Wilson*

It is customary for engineers to reckon 20 lb. per ton as the resistance offered to mine cars on a good track. My notes show that this is insufficient, as there are a number of items having a bearing on the subject.

A. M. Wellington found that it required 5 lb. per ton to pull a loaded freight car and 7 lb. per ton to pull an empty freight car over a level railroad track at 10 mi. per hr.

R. Van A. Norris made 980 tests some years ago, which gave a resistance of 26 lb. per ton for 20 loaded mine cars and 42 lb. per ton for 20 empty mine cars of the same size over the same track, traveling 4½ mi. per hr. One reason for the wide difference between the two sets of experiments mentioned is found in the size of the car wheels.

The freight cars had 32-in. diameter wheels, while the mine cars had 16-in. diameter wheels, thus making it possible for the former to ride over the inequalities in the roadbed with more ease than the latter.

Mr. Norris's experiments brought out another important matter not usually mentioned in haulage articles; namely, that it requires more power per ton to haul short trains of mine cars than longer ones. This is of added importance to those mines which have adopted the two-unit locomotive in order to pull heavier loads.

One factor that probably reduces the ton resistance in longer trips is that the forward cars clean the track; and another is that the greater momentum of longer trips aids in keeping the cars moving.

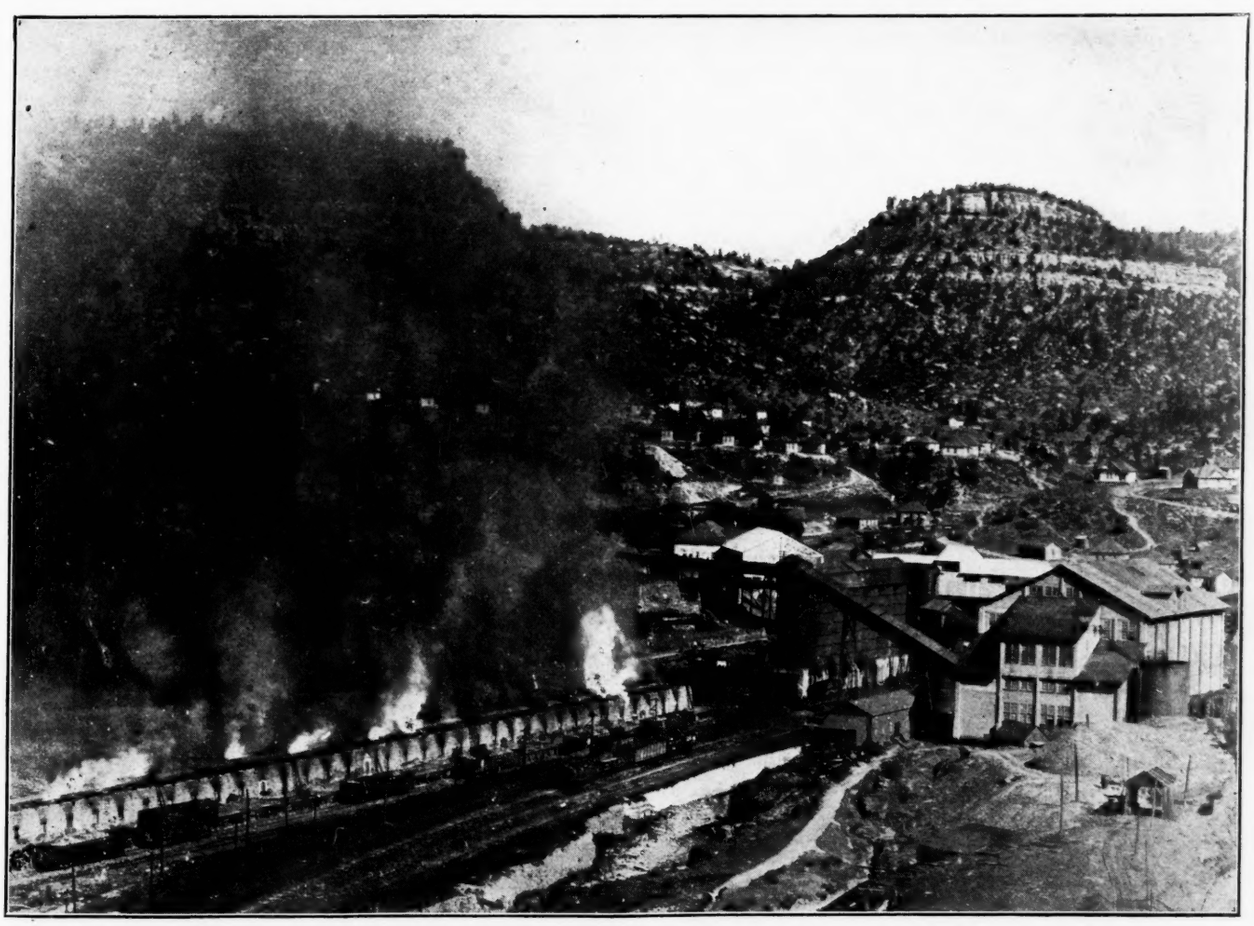
Professor Baker made some experiments on clean and dirty tracks, the results of which briefly were as follows: On a perfectly clean track the resistance was 19 lb. per ton; on the same track with ⅛ in. of fine dust the resistance was 28 lb. per ton; while with ⅛ in. of powdered stone the resistance was 40 lb. per ton. This should comfort superintendents in the soft-coal mines who begrudge spending money on road cleaning, because when they clean the haulage entries, they not only lessen the dangers from explosions, but decrease the cost of haulage.

It is also a lesson for some anthracite superintendents, for fine anthracite is nearly equal to sand in offering resistance to traction effort.

*Scranton, Penn.

Snapshots in Coal Mining

BRIQUETTE PLANT OF LEHIGH COAL AND NAVIGATION CO., LANSFORD, PENN.



COAL WASHERY AND COKE OVENS, STAG CAÑON FUEL CO., DAWSON, N. M.

Labor Problems at Coal Mines*

By J. W. Bischoff†

SYNOPSIS—The labor problem is of leading importance, and many a plant at great expense solves every difficulty but this and fails to be efficient because it works perpetually at half-force.

The most acute problems in the production of coal today are the scarcity of railroad cars and the lack of efficient labor. Fortunate indeed is he who is well supplied with both.

As mining men we are not directly responsible for the lack of railroad equipment, and we are in no position to remedy our difficulties. Nor are we able to correct the labor shortage except by inducing men to come to our mines from the plants of our competitors. There are few among us who fail to look at that question from a personal or selfish standpoint and who would not welcome an increase in their working forces, even though the men acquired were secured by someone's loss.

Scarcity of cars and labor, distributed equitably, impose a loss on no one; the final results, measured by dollars and cents, are the same. He who has plenty of both during times like the present is the envied one among the brethren.

Conscientious scruples are forgotten if by hook or crook the daily allotment of cars can be increased; also if the superintendent, foreman or some boarding boss can get some of the other fellow's men. In other words there is not even a gentlemen's agreement that would be violated in thought or deed if we see an opportunity to take advantage of our fellow man's shortcomings.

Labor Problem Given Minimum Consideration

During even ordinary periods of prosperity, with nothing extraordinary affecting the supply of available labor, the problem of a reasonable supply of this valuable commodity is the hardest that many of us have to solve. Inconsistent as the following may sound, it is the one problem given the least earnest, painstaking and intelligent thought.

Expenditures for machinery and for mining, transporting and preparing the coal for market are freely made by the owners, but the securing of that labor necessary to get the most efficiency from the equipment is, if given any thought at all, delegated to the local officials or left to the whims of chance or fate. We are prone to look upon it in much the same light as did the farmer who in answer to a friend's expressions of sympathy after a season of poor crops said: "Well, I have no reason to complain. Thank God, none of my neighbors have any better crops than I have."

Most of us have no doubt seen operations planned, developed and equipped for a production which was never reached by more than half owing to the lack of sufficient men. The loss in interest on investment alone is considerable, to say nothing of the profits (when there are such) on the additional output that should have been secured.

The newcomer in an already operating field, where the conditions and regulations of work are not fixed by the operator at his pleasure, learns the rate of wages paid and the house rents and store prices charged and follows scrupulously the practice of the district. He hopes when he is ready to mine that he will get an adequate supply of men; but he secures only those who are always on the outlook for a new operation. He has no reason to expect that enough men will leave other mines to enable him to operate at a reasonable profit.

As I said before, the labor-supply question is the one given the least earnest, painstaking and intelligent thought. We all know, some by hearsay and some by experience, that men may be secured by paying the transportation charges. I do not believe we now so frequently advance such charges in West Virginia as in the past. Under favorable conditions it works well. But as communities become more thickly settled, communication is much easier and more frequent, and if one alone indulges in the practice, his neighbors will benefit as much or more than he does. But with all its drawbacks the practice of paying railroad fare to needed mine employees is even yet resorted to.

Sociological Work without the Social Sense

Of late years we see and hear a great deal of sociological movements and moral uplift, which take the form of first-aid teams and meets, amusement halls, moving-picture shows, Y. M. C. A. movements, visiting nurses and domestic science teachers, more sanitary conditions about the camps, better houses, etc., all of which are good.

It shows that we have awakened to the realization that we are dealing with and have under our control something—a living and breathing being capable of thinking and acting—which we indirectly acknowledge we are dependent upon and whose place in the fixed order of things is invaluable; that it is profitable to keep him with us, and the better satisfied he is while he is with us the more profitable he is. This sounds mercenary. It is. But in the natural order of things, the interests of the two are so closely allied that one cannot truly prosper without the other doing likewise.

I do not mean to criticize adversely any of the welfare movements before mentioned, but I will venture the statement that they are more or less superficial, and unless conducted with judgment and knowledge of human nature as it presents itself in those we desire to influence, they are likely to be of little or no lasting benefit. As an example the following case occurs to me: Arrangements had been all but completed to install a visiting nurse and settlement worker in a certain mining town, but for some reason unknown to me it was abandoned.

Now these were a few of the actual conditions existent in that town: It was isolated. No passenger train service approached nearer than two miles. There was no means of ingress or egress except by walking, not even a wagon road. The houses were all built on a hillside, and no garden patches were available. Moreover, there were no fences around the individual houses. Livestock of all descriptions roamed at will. No coalhouses were

*A paper entitled "Some Suggestions and Ideas Based on Observation," read Dec. 2 at Fairmont, W. Va., before the West Virginia Coal Mining Institute.

†General superintendent, Davis Colliery Co., Elkins, W. Va.

provided, and the coal was unloaded on the ground, both in summer and winter. This was the custom when the team had time to deliver coal; otherwise the tenant carried his own fuel. The surface closets had received no attention for years, and there were many other faults in that mining village which I have not mentioned.

These conditions no doubt are extreme, but they are cited only as examples to show how mistaken we can sometimes be in our misguided efforts to uplift. I might add that I happen to know that the project of uplift was not abandoned because the conditions in the village were so unfavorable.

Should Miners Secure Homes of Their Own?

The weight of opinion seems to be against the miner owning his own home, but a casual investigation of conditions where such purchases have been made to some extent should furnish sufficient proof that within certain limits and under certain conditions the miner's ownership of a house and lot is beneficial to both miner and operator. It cannot always be advantageously arranged on account of unfavorable natural conditions, the uncertain or certain short life of the mine and other difficulties that could be mentioned, but cases are numerous where it could be applied, and on the whole I am inclined to favor it. Any man, though there are sufficient exceptions to prove the rule, who is ambitious enough to want to own his home will make a better citizen and workman. He is likely to be steadier, more conservative, reasonable and amenable to discipline.

And then the question arises as to the desirability of the company store as I prefer to name it. I do not like to hear it called the "commissary." That term is appropriate when applied to the store rooms of construction camps of railroads and reasonable enough when applied to the stores installed to take care of workmen engaged on some temporary job, but the use of the word in a mine village reflects on the stability of the industry.

The treatment, in every sense of the word, accorded the miner and his family in their dealings with the store can have as much or more influence upon the miner for good or evil than his relation with the superintendent or foreman. This fact is too often overlooked. In many cases the responsible head of the mercantile department reports to someone higher up who is not in touch with actual everyday conditions around the mines. Thus in his effort to show his part of the business to the best advantage he creates friction and discord for the local managers and superintendents. I have known more dissatisfaction to be caused by a real or fancied wrong at the hands of some unthinking clerk than the foreman would cause in months.

Fortunate indeed are those who are never troubled with labor shortage. The others may take a lesson from their more favored neighbors. There are numbers of mining communities that are able to command a steady supply of labor. Study them, learn from them and profit from the mistakes of him who is satisfied to stay in the same old rut.

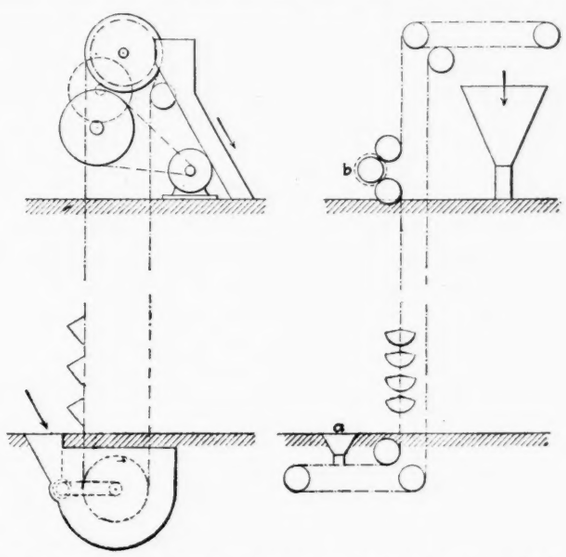
There is a fixed amount of labor, and he who gets more than his quota will be the one who will reap the biggest harvest. I have not intended to introduce sentiment, humanitarianism or paternalism into this discussion, for to me this care of the miner's interest appears to be a simple business proposition.

The Conveyor as a Shaft Hoist

The ordinary shaft hoist has certain inherent objections, such as weight and inertia of intermittently moving, imperfectly balanced parts and loss of time through the reverse motion. These obvious disadvantages increase with the depth. They may be largely overcome by a hoist on the belt-conveyor principle, and although the latter introduces many new difficulties of its own, it is interesting to see how far these can be overcome and whether there is an economic field, at least a limited one, for the continuous elevator in vertical shafts.

Attempts in this direction have been made in Germany, for example, with some success in shallow mines. The various systems are discussed in a noteworthy article in "Glückauf," by Dipl.-Ing. F. Wintermeyer, of Berlin.

Two of the oldest German installations are at the Emma mine of the Consol. Sudersscbe Lignite Co., Helm-



FIGS. 1 AND 2. TWO ARRANGEMENTS OF BUCKET ELEVATORS AS SHAFT HOISTS

stedt, and the Karoline mine of the Germania Co., at Gorma, near Rositz. These were made by the Machinenfabrik Buckau and the hoisting depths are 170 and 128 ft. respectively.

Fig. 1 is a diagram showing the principle of these hoists, without entering into details. The one at the Karoline mine is driven by a 25-hp. motor and with a chain speed of 2 ft. per sec. the delivery is 70 tons per hour.

An improved type of elevator has pivoted or swinging buckets, as shown in Fig. 2. Here one of the filling hoppers is marked *a*. At the Johanne Henriette lignite mine, near Unseberg, is a swinging-bucket hoist made by the Buckau works for a depth of 262 ft. Shaft guides are provided for the chain. Two men suffice to attend to the hoisting.

A design of continuous hoist intended to be applicable to greater depths is David Davy's English system, dating from 1901. It was proposed to lift cars as usual on cages, which were to be hooked to a constantly moving chain and removed from it at the landing. Intermediate sheaves are provided to relieve the weight on the upper one. The system of Cséti v. Verbó differs from Davy's in discarding the use of car cages and hooking the car

bodies to the chain as buckets. At the top of the shafts these are dumped without detaching.

Schwidthal has devised a system of motor-driven intermediate sheaves. Unlike Davy's method, they are used primarily with fixed buckets.

Some work diagrams for different hoisting systems will show the power consumption at different points of the operation. Fig. 3 is for a rope hoist with drum and tail rope. Fig. 4 corresponds to a hoist with driving sheave and tail rope. Fig. 5 is for one with drum

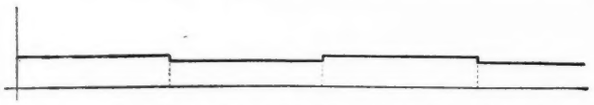


FIG. 3. DIAGRAM OF POWER CONSUMPTION OF A CONTINUOUS SHAFT HOIST

but without tail rope. Fig. 6 is a diagram for a continuous hoist, that shows not only a greater uniformity but a saving in power.

In conclusion it appears that the use of continuous hoists for shallow mines has reached a practical stage while for deep shafts they are more experimental.

Pages from a Miner's Notebook; the "White Collar" Job

It may be pride; it may be only the practical demonstration of the laws of evolution, of advancing the child to a position in life superior to that of the parent; but whatever it is, there is something pathetic to me in the boast of many an old miner who undoubtedly entered the mines at the age his son is now in the last grades of the camp school that "my boy shall never go into the mines."

Yet it is only natural. The father has known nothing but hard, back-breaking toil since his early boyhood, and even though pathetic it is a supreme example of parent love, a manifestation of fatherly care and pride, this desire of the men of the mines that their sons shall have "white collar" jobs.

Still, it is a mistake. There must be miners, and how better, as a class, could miners be improved than by the adaptable, common-school educated American boy following in the trade of his Scotch or English father, learning from this best of workmen the workmanship of the mines and adding to this lesson the natural desire of the American boy to improve on old methods.

The eldest son of an old Welshman arrived in camp last night to "visit" his parents. He is something in the city—physician, lawyer or stenographer—what, nobody seems to exactly know. Whatever it is, he has not made such a mark as to have his fame on every tongue.

His parents were overjoyed to see him, yet his indifference was apparent to all but those same parents. They proudly walked with him up and down the main street of the camp; to the store for their weekly paper, where the son stood about awkwardly, self-conscious under the scrutiny directed to his flashy clothes.

They sat on their front porch until a late hour, yet there was no sympathetic talk between them. The mother asked questions which were answered perfunctorily. A younger sister played upon the piano, the only luxury the old folks possessed except the son, but her music elicited no complimentary response from the guest. The evening was a trying one for all concerned.

He left for the city this morning after his father had drawn heavily on the scanty savings laid by at the company store, and the old mother, with a puzzled look in her eyes, confided to my wife that there was "somewhat of a difference in her John."

And what a world of pathos there was in that "somewhat of a difference in John"! John would have made a good miner. His earnings, while he remained single, would have added much of comfort to the old age of those self-sacrificing parents; yet that fatherly pride and the carrying out of the boast that "my boy shall never go into the mines" had made him a mediocre physician, or lawyer, or stenographer, or whatever he was; had given him a "white collar" job while his old father supplied the cash to keep the white collar laundered.

Sanitary Drinking Fountain

In its broadest sense the safety movement so prevalent at the present time, and which has for its avowed object the preservation of human life and limb, should also include the preservation of health as well. Conditions that foster or aid the propagation of germs or the spread of contagion should be treated as carefully and as thoroughly as should a dangerous piece of machinery or a section of loose roof.

When many mining companies some time ago discarded the water barrel and dipper for the bubbling drinking fountain in shops, power plants and tipples and even underground, a long step was made in the right direction. Investigation by the Federal health authorities has shown that one person out of every 47 has unmistakable signs of contagion. Any public drinking device that permits a person's lips to touch a metallic surface is not sanitary.

FOUNTAIN WITHOUT BOWL IN OPERATION

As a further sanitary improvement the H. W. Johns-Manville Co. has placed upon the market its J-M Sanitor fountain head. As may be seen in the accompanying illustration, this consists of an annular nozzle from which eight small convergent streams of water are emitted. These meet in midair and form one vertical drinking stream. It is impossible for a person using one of these fountains to touch or otherwise defile with his lips any of the metal parts, except by premeditated and malicious intention.

Projection of a Panel Mine*

By Guy E. Greer†

SYNOPSIS—A properly designed panel system provides a large tonnage from a small working area, largely prevents squeezes and localizes them if they occur and provides an ideal ventilating system.

This paper is based on a projected system of panel working, the tract of coal consisting of 991 acres, presumed for convenience to lie in Braxton County, West Virginia. The projected work is presented mainly for the purpose of inviting discussion on the merits of the panel system as applied to the Pittsburgh seam of coal.

On paper this system, with the rooms advancing and the pillars retreating, has almost everything in its favor, as opposed to the hit-or-miss principle of driving rooms and entries. The advantages may be briefly summarized as follows: Better control of the ventilation can be secured, and from the fact that each panel is practically surrounded by airways, the ventilation can be altered to suit almost any possible condition; the gases and powder smoke from each panel are carried directly into the return airway and are not circulated through other parts of the mine; fires or explosions are more likely to be confined to the panel in which they occur; squeezes are in a great measure eliminated, and if they do occur, they are more easily handled because they are confined to one panel; the output of coal may be better regulated, and the work concentrated so that the organization is more efficient.

Inasmuch as the method of operation discussed implies working the ribs as soon as the rooms are driven to their limit, it follows that cleaner coal will be obtained; also, since the roof is not permitted to stand for a great length of time, the expense of timbering is reduced.

Only One Roof Break Needed in Each Panel

The advantage of the panel system is most apparent in the extraction of the coal. Each panel, as shown in the drawing, has 6 butt headings. The method of working specifies that the upper 10 rooms on No. 1 butt (see panel A) are to be worked first. When these are driven up, pillar work is ready to be started. At the same time the lower 10 rooms on No. 1 butt and the upper 10 on No. 2 butt are started. When the break line, gradually retreating, reaches the entry, the lower rooms on No. 1 butt and the upper rooms on No. 2 butt are ready to fall into line. The advantage of this plan of working lies in the fact that only one initial break of the sandstone need be made for each panel. It is this initial break that is often the dangerous and expensive feature of drawing ribs.

If the break does not occur within a reasonable time, the extra pressure on the diminishing ribs will crush the coal, the roof will become treacherous and the bottom will be likely to heave. This danger period is met once and for all in each panel after the break line is started. If a squeeze should result, all room work may be suspended, the squeeze may be localized and the proper measures taken to rectify the conditions, whereas in that system where all the rooms are driven up before any pillar work is started, a squeeze is far more difficult to control and cannot be prevented from spreading.

In a room-and-pillar system where a haphazard method of driving entries and rooms is followed, the men are scattered widely over the mine. This complicates the haulage problem and reduces the number of wagons which a driver or motorman can handle. Adequate supervision is also rendered difficult and expensive, and the tendency will be to slight this important part of the organization. This will inevitably result in waste of material, inefficiency of day labor and a small output for each miner. It is also a most prolific source of accidents and would be likely to promote dissatisfaction among the men.

Estimates 500 Tons and 40 Rooms to a Panel

In the panel system, however, the work may be concentrated, so that a large output may be secured from a relatively small part of the mine. After the first 20 rooms have been driven up and the break line is well started, 40 working places will be available in one panel. Assuming two men to a working place, if each mines four wagons of two tons each per day, an output of 640 tons may be secured from one panel.

Allowing for contingencies of all sorts, it will be safe to assume an output under normal working conditions of 500 tons per day for each panel. Thus the daily output of the mine may be made 1,500 tons by working three panels. In the meantime of course the entry driving is being carried ahead, so that the output will probably be more.

Practically the only disadvantage of the panel system is the fact that since entry driving may be slow some time must elapse after the opening of a mine before a large output may be obtained. This is a disadvantage that often prevents this system from being used. It is always desirable when starting a new mine to show a large output as early as possible. This has been provided for in the projected workings shown in the illustration. Sections 1 and 2 are purposely left free for "hogging" in order to secure quick development. These sections are near the opening and may be worked soon after the main entries are started.

From all the evidence obtainable the dip of the Pittsburgh seam in the section under consideration is slight and openings to the outcrop are easily made.

Specifications for Working the Coal Area

The main entries are to be six in number and driven on the butt. Entry A and the main right entries are to be four in number until panel C is reached. All the other headings should be on the two-entry system.

Ventilation is to be by exhaust, making intakes of all haulageways. In all cases half the entries are to be taken as intakes and half as returns. The returns are to be on the outside where there are more than two entries. Each panel is to have one split of air. A suggestion as to the ventilation is shown in the plan in panel C.

*Paper entitled "Projecting a Mine on the Panel System," read before the West Virginia Coal Mining Institute, at Fairmont, W. Va., on Wednesday, Dec. 8, in the Watson Building.

†Morgantown, W. Va.

All entries are to be driven on 60-ft. centers, with 10-ft. passageways and 50-ft. ribs. All rooms are to be spaced on 60-ft. centers, to be 20 ft. wide and to have 40-ft. pillars, but this rule is not of force for working out boundaries of irregular sections.

In section 1, which is for quick development, the rooms and entries are to be standard, except that the former may be turned to follow the boundary lines after the butts are driven up. In order to secure a quick output each butt heading is to have a separate break line in drawing the ribs. That break line is to be started on the last room (the one nearest the outcrop), and the retreat is to be made toward the cross-entries.

In section 2, which is also designed to aid in quick development, standard rooms and entries are to be driven. Each butt heading is to have a separate break line, as in section 1. Entry barrier pillars are to be withdrawn after working out the last ribs of the section.

In section 3, standard rooms and entries are to be driven, the former being opened from both the entry and aircourse.

In section 4, standard rooms are to be driven from G, No. 7 aircourse, and from the butt heading, which is driven south from G, as shown in the drawing.

Section 5 is to be worked in connection with the removal of the main-right-entry barrier pillars. Standard rooms are to be driven from the main-right haulage.

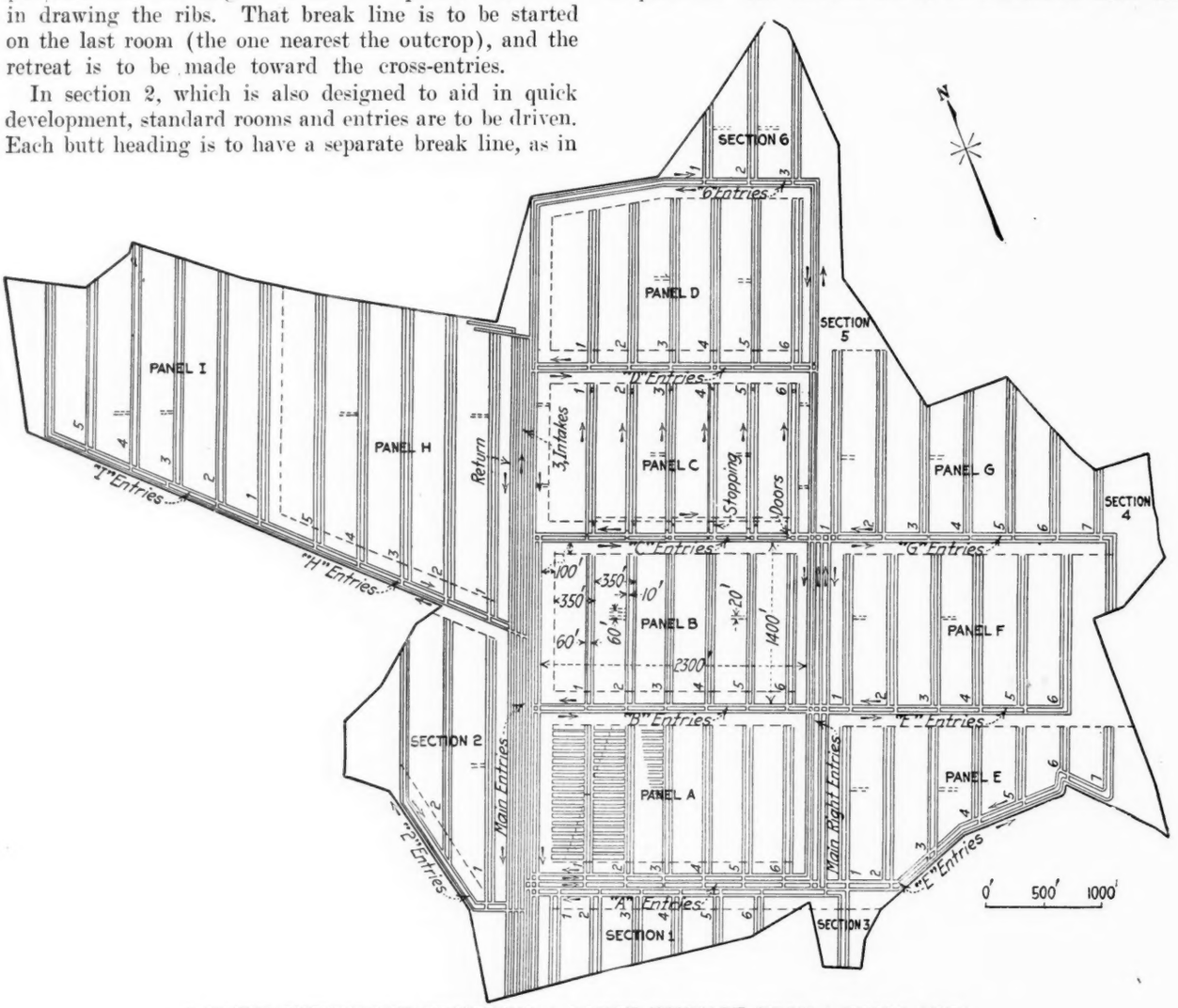
Section 6 is to be worked on the retreat after panel D is worked out. Standard rooms are to be driven and the break line started after the completion of the last room of No. 3 butt.

Panel A is to be worked on the advance. Standard rooms are to be driven and a break line started upon the completion of the last room in No. 1 butt, as shown in the drawing. Panels B, C and D are to be worked on the advance as panel A, while panel E is to be worked on the retreat. Standard rooms are to be driven and a break line started upon the completion of the last room in No. 7 butt. All barrier pillars are to be withdrawn.

Panels F and G are to be worked on the retreat just as panel E. All barriers are to be withdrawn after the ribs are extracted in section 4. Panel H will be worked on the retreat. Standard rooms will be driven and a break line started upon completion of the last room in No. 5 butt. If necessary or desirable for quick development, entries may be driven along the outcrop on the north side of this panel. Barrier pillars are to be retained.

Panel I is to be worked on the retreat, as panel H. All barrier pillars are to be withdrawn, including those between panels H and I and the entry barriers of panel H.

All the remaining barrier pillars are to be withdrawn after all panels and sections are completed, taking in succession the main right, D, C, B and A and main entries on the retreat.



A PANEL SYSTEM FOR PROVIDING A LARGE TONNAGE FROM A SMALL AREA

Continuous Face Haulage

By J. F. K. Brown*

SYNOPSIS—A system of rope haulage is here described that is continuous, handles about 600 tons per day and may be easily advanced as the workings progress.

The expression "face haulage" would indicate a means of disposing of the coal output from the working face by a haulage system so flexible as to be capable of rapid extensions. The system described hereafter as conforming to these particulars and which has been used as a means of transportation at the face for many years has the following special points of interest:

(1) The tonnage handled is large, 600 tons per day. (2) The system is of the endless-rope type, the empty cars entering the section at one end and the full ones leaving at the other. (3) Cars can be taken off at any point along the rope, and full ones attached. (4) This system has been used in both room-and-pillar and longwall mining. (5) The haulage can be operated around corners of a right angle and less at a radius of 3 ft. (6) The cars will leave the rope automatically at any point selected.

As originally developed the system was designed for pillar-and-room working and was only afterward adapted

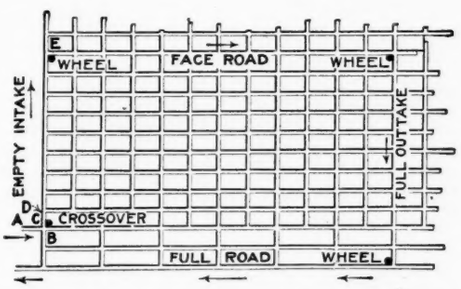


FIG. 1. GENERAL LAYOUT OF THE HAULAGE SYSTEM

to longwall. The first factor to be noted is that this system, like the operation of coal cutters, has to have the operating section laid out to suit the haulage, and no success need be anticipated if the attempt should be made to transplant this haulage method into just any section, anyhow. Fig. 1 shows a typical section and the one in which the system was partly developed. The great regularity and evidences of design in the laying out and working of rooms and pillars are the principal points of interest. To lay out and keep up to the mark in operating such a working section should be neither an effort nor an extra cost to the engineering staff of any coal mine.

It Paid To Plan Carefully

From experience in the particular mine described it was found that it paid well to have and to maintain this regularity. There was the direct benefit in cheaper haulage, ventilation was much simpler, break was more regular and dependable in working back the roof, the same roads in working back could be used again as haulage roads, turns, points and crossings were all standardized and rail lengths were always maintained the same, thus making less cost in the blacksmith shop.

Rooms were maintained at a width of 12 ft. and pillars 60x40 ft., the position of the room being laid off by measurement, and the alignment kept by roof lines. Every third road was held as a haulage road, hence the distance which the miner had to tram his coal never exceeded 140 ft., and as all the roads went through together and in line, there was never any delay in adding to the rope and transferring the haul to the new road. This change was usually accomplished during the night, a spare set of wheels being kept at hand and built in, in readiness for the removal.

From the illustration it will be seen that the various roads are referred to as the empty intake, the face road, the full outtake and the full road; the full outtake and the face road are the ones on which coal is attached to the rope. The haulage is a side-rope system with the rope on the side of the cars farthest away from the working places, while the turns are always to the right in the direction that the rope is running. It is only on a turn of this type that the rope can remain constantly attached to the car, as at any turn in the opposite direction the car has to leave the rope itself and be reattached by hand at some point round the corner. In Fig. 1, such a turn is shown at *B* and is known as a cross-over turn. Cross-over turns are to be avoided, if possible, since they require an attendant.

Locating the Turn Outs

In operation the rope with its complement of cars attached at regular intervals enters the section at *A*, Fig. 1, and travels round the cross-over turn at *B* and round the turn at *E*. From this point right across the section in every second or third road "turn outs" are laid, that is, points and crossings whose directions of approach to the main tracks are the same as is the direction of the cars on the main road. Sometimes these "turn outs" are connected with "back lyes," parallel roads to the main track, which are used as sidings for storage of pit wagons.

At first it was left to the miners themselves to tram their cars to the road and attach them to the rope, taking off an equivalent number of empties. Through time, however, it was found that this sometimes led to unequal distribution of the cars available and that the men at the beginning of the section managed to get their day's work finished much in advance of the men at the outward end.

As a result six boys were taken on, known as "drawers," whose duty it was to see that a proper distribution of cars was made at each turn out and to see that the last man in the section was fairly treated in the matter of getting pit wagons for his coal. These six lads did all the taking off and hanging on of the cars, and it was after their commencing work that the storage tracks were built in order to allow provision of enough cars to keep the men going while the drawers were at the other end of the section. At *E*, Fig. 1, the rope turned into the full road and so ran without further attention to a point where the cars automatically left the rope and ran to a collection point for an outside haulage. Four face haulages of this type landed their loads at this one point.

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The cars are regularly spaced when being attached to the rope at an average distance indicated by a hammer bell. Too close spacing results in wrecks wherever there is a hollow in the road. This is because the tightness of the rope causes it to lift out of the holder, thus leaving the car on the road for the next oncoming one to strike, and perhaps butt off the track. Spacing too far apart has the same effect, except that the accident then results in the weight of the rope upending the empty car: but a long length of empty rope can be run around the section provided several cars are dispatched together and not a single one at a time. The better plan when the supply of empty cars for the rope gets slack is to insist on regularly stopping the haulage until the cars needed are available.

Attaching the Rope to the Car

The rope is attached to the car by the jigger and holder shown in the drawing, and the height from the floor to the rope when in the jigger is 21 in. As the jigger is free to turn in the holder, there is some lateral

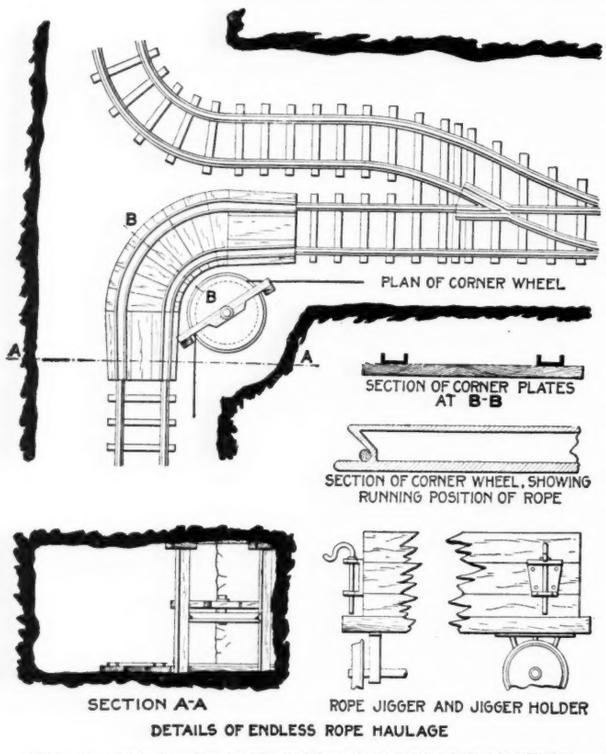

FIG. 2. SOME DETAILS OF THE HAULAGE SYSTEM

play between the rope and the box, and this causes a greater grip to be exerted automatically between the rope and jigger at places where it would be most needed, such as a pull uphill. Detaching is attained by suddenly lowering the rail level a few feet in front of a pulley to which the rope is at the same time being raised.

Usually the cars are being drawn up to this point, and the mouth of the jigger is ahead of the car box, but at the point where the level changes the cars run forward, bringing the jigger square and into a position at which the rope is more easily detached. It can then lift itself clear. In some cases where the jigger has become worn and sticks to the rope, it is simply lifted clear of the holder entirely and, running with the rope, comes against a heavy wooden cleat, in this way being knocked off the rope before the latter goes round the pulley. In detaching the cars in the workings all that is necessary is simply to lift the rope out of the jigger and quickly drop it to the side.

The passing of the cars round the acute turns is managed by the aid of the corner plates and the turn wheel, as illustrated. The jigger runs on the rim of the wheel and drags the car round in the channels; these narrow up at the end so as to guide the wheels onto the rails. Care has to be taken that the wheel is properly set and the correct height above the rail level maintained. The wheel should run parallel with both tracks, and the take-off of the rope should be easy. The haulage tracks require to be well laid to the roof lines, and of course to proper gage; while at the turns, the turn plates and rails should be well stayed.

The following particulars of a typical installation will be interesting:

Number of miners in section	98
Number of tons per man	6
Number of men per place	2
Cars per day	860
Tons per day	600
Weight per car	14 to 13 cwt.
Tare of car	4½ cwt.
Size of car	4x2x3 ft.
Rails handled in 12-ft. lengths	weight 24 lb. per yd.
Gage of road	24 in.
Rope, plow-steel	weight ¾ lb. per ft. and 2½ in. in circumference
Height of coal	72 in.
Nature of roof	Good, sandstone

Nature of section, flat, little water, good roof and floor, coal easily mined, roof weight helping considerably.
Grade, practically horizontal, about ¼%.

Labor in Section	Wages per Day
Deputy, at $3, for one-third time	$1.00
Haulage man, at $2.50	2.50
Six drawers, at $1.75	10.50
Two roadmen, at $2, for one-half time	2.00
One boy, at $1.50	1.50
One night roadman, at $2	2.00
Shifting and haulage cost, about $210 a month, per day	3.50
Total	$23.00

Of these only part time of the roadmen and very little (about one-third) of the deputy's time are charged against the haulage, which gives a cost on the tonnage named of 3.83c. per ton. The distance traveled is 2.08 mi., which works out at a rate of 1.84c. per ton mile, which for a face haulage compares most favorably with the largest and most permanent of endless-rope haulages.

Rolls in the Floor Are Serious Obstacles

This system has its drawbacks of course, and the main one is on account of rolls in the floor. There is no difficulty in this provided the rolls encountered are long and not so sharp as to cause abrupt changes in the relative height from the floor to the rope, but should this occur, the rope does not get the chance to adjust itself to the ups and downs of the strata. As a general rule the more coal it is desired to handle the flatter the seam must be since the cars must be run closer.

A haulage system of this type with only a small tonnage depending on it can be manipulated over an undulating floor, since the cars in this case can be kept far apart. Too heavy a grade is also detrimental to smooth working, and about 8 per cent. represents the limit. With a higher grade than this trouble develops at the turn wheel, where the direction changes from the level to the down grade. Every time a car comes round the wheel, it suddenly runs forward with a vicious jerk and more often than not throws itself off the road and rope as well.

This haulage, however, possesses many worthy advantages and, provided it is applied under suitable conditions, is an economical and handy method of transportation.

Relation of the Mine Official to the Consumer*

By R. Z. Virgin†

SYNOPSIS—The mine official should view the coal sales from the viewpoint of the consumer, and he would then be more careful in supplying well-prepared coal of a size such as the consumer desires and tight, clean and easily unloaded cars delivered regularly as ordered.

There is a necessity for a new note to be sounded by mine officials if they would be successful. They should realize that in strictness they are not working in the employ of the company which has engaged them, but ultimately for the consumer who in the end pays all bills. His money keeps the industry going, and when the customers cease coming, the mine usually stops running.

Business stays only when care is taken of it. Give it more assiduous attention than the other fellow, and the result will be that all will have "quality coal" to sell and the consumer "quality coal" to burn and not bone, slate and other impurities. The customer will then have fewer clinkers, fewer ashes, cleaner grate bars and more efficiency.

The quality of the coal should be regular and therefore dependable, and the service rendered the consumer should be the best. The slow, inactive, indecisive and unconcerned mine official who has no thought of anything but quantity and cost and who entirely ignores the customer's requirements must sooner or later drop from the ranks of the leaders. For the customer's rights should always predominate. He knows what coal and service suit him best, and his rights to these preferences should not be abridged by the mine officials.

Every mine official who can arrange affairs at the mine so as to give the customer the service, quality and quantity he wants makes his company a reliable concern, and the consumer begins to bank on the shipper's service. This means more orders, more profits and better standing for the mine official.

Ascertain Consumer's Unloading Facilities

If possible, get the consumer to give you an idea of his unloading facilities, so that when he orders his car of coal you may know that his bin or siding will accommodate the equipment in which the coal is forwarded. In small plants and factories and in cities where storage is a factor, the length and height of the cars are important items to consider. It is necessary also to ascertain under what conditions the coal is used, the kind of place in which it is unloaded and what facilities are available. It is not well to send a 50-ft. car if the consumer's siding is only 40 ft. long, or a hopper car if the warehouse is suited only to a gondola.

If the consumer wants a car every alternate day, don't send him two cars and then skip three days and send him another. He might have to pay demurrage. The orders to the tipple-loading crew should be made flexible enough so that these men could select the coal for different customers in a manner that would suit their purpose.

For example, screened coal for use under a boiler need not be as large as coal going over the same screen to be used for domestic trade, where it is mostly used in stores. After the tipple foreman has had much experience, he can detect a trip coming from the mines which has been dug by pick and can distinguish pillar coal from that which is mined and loaded after being cut by machine.

Mine officials should not argue with a customer. Adjust his grievance to his satisfaction, and if his business is unprofitable to you, tell him so frankly. An argument with a customer which led to a dispute over a matter of adjustment amounting to only $1 lost a coal company a profitable contract which it had enjoyed for several years and which was procured by mail-letter solicitation.

The coal should be primarily prepared at the coal face; and this preparation should continue until the fuel is screened and loaded. It is necessary to impress on those making the final inspection that the permanency of their jobs depends on the elimination of impurities.

Cars should be thoroughly cleaned and the holes roughly mended, so that shipments will reach the customer safely.

Careless Car Repairing Hinders Unloading

The repair used must be such that it will not inconvenience the customer in unloading the equipment. Heavy planks and pit rails should not be used to support drop-bottom doors, as a weight of 25 or 30 tons of coal on these planks makes them too tight to remove. If no planks are put in, no one need get under the cars to open the doors and no accident occurs from this cause. At the tipple a supply of quick-repair links, open links and a few bolts should be kept. Don't attach an engine to tighten hopper bottoms; perhaps the consumer has no such equipment to unfasten them.

An instance can be cited where a car had been used for hauling pig iron. Some of the iron froze to the floor, and when the car dropper loaded the car, he did not remove the iron because it was frozen fast. But the warm coal from the mine thawed the pig iron so that it became loose, and when the customer unloaded what he thought was merchantable coal, the pig iron with the coal fell into a crusher, and rolls costing over $200 were broken and the operation of the plant was delayed for several days because it was impossible to supply the stokers with the coal of the right size.

See that cars are properly routed so as to avoid expense, delay and disappointment in delivery to the wrong siding. If you do not have the equipment the consumer wants, advise him; don't send him a hopper if he wants a gondola unless he gives his consent.

Give the customer a correct billing of weights. If estimates must be made, try to get as close to the truth as possible, as overestimates will recoil. The figure you enter as the weight should be based on the average of

*Paper entitled "The Relation of the Mine Officers to the Consumer," read Dec. 8 at the meeting of the West Virginia Coal Mining Institute at Fairmont, W. Va.

†Superintendent, West Virginia-Pittsburgh Coal Co., Locust Grove mines, Colliers, W. Va.

several cars of the same class loaded with the same size of coal.

If the customer inquires about a car or shipment, be courteous. Give him all the information available and don't say, "Shipment went forward as ordered, and it is now up to the railroad to make delivery." Speak kindly; a little interest in the consumer's needs costs but little.

The high-powdered, high-priced salesman with a glib tongue may secure the first order, but the continuance of the business is in the hands of the mine officials. The very lifeblood of the mine depends on the grace of the customers, and a paying plant covers a multitude of sins.

Photographing an Explosion

By John Pelligrino*

The accompanying photographs show an explosion which occurred on Nov. 13, 1915, at mine No. 7 of the McCormick Coal Co. (operated by the Sheridan Coal Co.), about 1½ mi. southeast of Arma, Crawford County, Kan.

This mine is 224 ft. deep and struck coal in January, 1915. The coal bed worked is about 3 ft. thick. The main entries run east and west and are now about 1,000 ft. long. The third set of entries are turned on the east side of the mine. Operation is on the room-and-pillar system, and about 150 men are employed. The coal is hauled to the bottom by mules and is raised on self-dumping cages by a steam hoist. The mine produces 500 tons of coal per 8-hr. day.

Some marsh gas is found every morning by the fireboss, whose duty it is to examine carefully every working place with a safety lamp and to dilute and render harmless such gas as is found.

I was notified on Nov. 13 that an explosion had occurred the day before at the mine which did not damage it very much as it was operated on that day. On Nov. 13, however, the barometer was falling low, and as weather conditions were favorable for an explosion, I decided that I would try to take a real photo of a mine explosion if one should occur that day. Immediately on arriving at the mine I prepared my kodak at a suitable place on a dirt dump about 75 ft. from the mouth of the shaft.

Owing to the dangerous conditions existing in this mine the Sheridan Coal Co. has installed a Schietzel electric shotfiring device. This explodes the shots at a time when all the men are out of the mine; consequently nobody's life is endangered while firing shots.

The miners prepare and tamp their shots and attach them to the electric wires, which are in each working place. About a half hour after quitting time, when all the men are checked out of the mine, the electrician in charge of the shotfirer explodes the shots by firing one entry at a time. There are therefore from 30 to 65 shots to be fired simultaneously in each entry.

On account of it being payday the mine only worked until 12 o'clock and the electrician commenced firing about 12:35 o'clock. He fired six entries without any trouble, but as soon as he threw the switch for the seventh

FIG. 1. THE MINE EXPLOSION

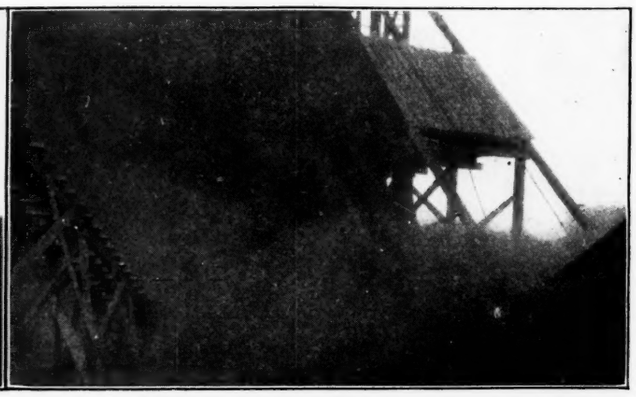

FIG. 2. TWO MINUTES AFTER EXPLOSION

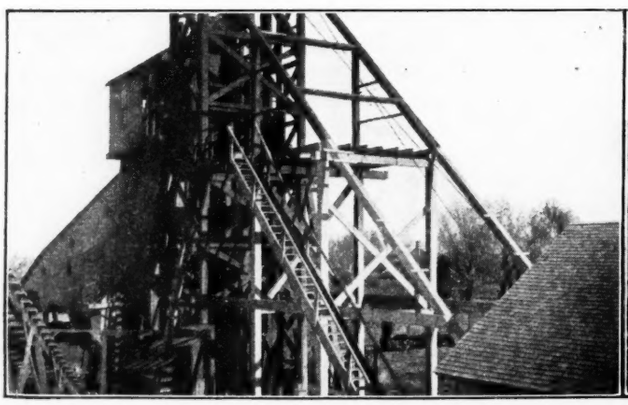

FIG. 3. THE TIPPLE UNOBSCURED BY SMOKE

FIG. 4. FANHOUSE WRECKED BY AN EXPLOSION

*State mine inspector, Pittsburg, Kan.

entry the explosion occurred. I could hear a rumbling noise and a sound like a cannon going off. At the same time fire and smoke belched out of the mine, chunks of coal, timbers and boards commenced flying, while the dense smoke that enveloped the tipple and the noise of the timbers and boards cracking made it appear to me as if the tipple was falling over.

There was one cage hanging in the circles at the time the explosion occurred, but the force threw it out and wedged it tight above the circles. The smoke and fire went up in the air for about 500 ft., and it looked like a burning oil well. The smoke hung around the mine for about an hour after the explosion.

Fig. 1 shows the explosion at the moment it appeared on the surface. Fig. 2 was taken about two minutes after the explosion. Fig. 3 was taken on Nov. 23 from the spot where I snapped the explosion on Nov. 13. Fig. 4 was taken on Nov. 23 and shows how the roof of the fanhouse was blown off by another explosion occurring at this mine on Nov. 22.

Extracts from a Superintendent's Diary

Today we were honored by a visit from a man of whom none of us had ever heard. He introduced himself as a large stockholder of our company and informed us that the object of his visit was to see how the company was carrying out its moral obligations. He said that he was not personally acquainted with any of our directors, and that he had inherited his interest in our company.

He said that his block of stock was not large enough to give him voice in the company's management, no matter what his inclinations might be, but as he felt it to be his duty to at least post himself on the affairs of the company, he had decided upon today's visit.

I took him in hand personally and conducted him all over the property, both inside and aboveground. Then I introduced him to some of our most intelligent miners and company men. And finally I took him all through my residence and also the homes of several of our miners.

Then we went back to the office, and he began to ask questions, which I answered to the best of my ability.

By profession he is a college professor, and all of his ideas about labor problems have been obtained from books and magazines. His vocabulary was full of such terms as collective bargaining, minimum wage, paternalistic tendencies and industrial democracy. Sometimes I felt inclined to give him the kind of answers he so evidently expected rather than to suggest that no one within my knowledge could give him the information he sought, based on actual experience, but I managed to curb my inclinations somehow.

I attempted to explain to him that my convictions about labor unions and labor leaders were subject to frequent change, but he could not understand how such a thing could be possible, and it soon became evident that to his mind every attack that had ever been made on any labor leader was made from "whole cloth" behind locked doors at some employers' association. That any manager could voluntarily and of his own volition choose to give his employees a square deal was beyond his comprehension. Again and again he made use of the phrase "exploitation of labor," and it was evident that he believed that all labor lived but to be exploited.

Seeing that nothing could be gained by discussing things most intimately connected with my everyday life, I led him off into a discussion that had to do with stockholders. It had always seemed to me that inasmuch as the stockholders received all of the profits that were to be had, some of them ought to be gracious enough to tell the world at large that they appreciated profits and were glad that they could be obtained regularly with so little trouble.

But my ideas were not the ideas of my visitor. He believed that because of the fact that the management of a company rested solely in the hands of company officials, who were not under the control of the stockholders, but reported only to directors, it was unreasonable to suppose that the wishes of the stockholders were given serious consideration. How could he prove it? Why, that was dead easy—stockholders consisted of all classes of people from ministers to gamblers and from bankers to bootblacks, and surely the majority of them would not countenance the exploiting of labor. I couldn't get beyond that. Whenever anyone intimates that I am an exploiter of labor, I have to change the subject or lose my temper, so I am still ignorant of a possible motive that leads company managers to wring profits from their employees to be turned over to stockholders who resent the necessity of receiving them.

Mine Officials' Brotherhood

About a year ago a movement known as the "Mine Officials' Brotherhood" had its beginning in a convention of mine officials held in the City of Dubois, Penn. The membership of the organization thus formed has since been steadily increasing.

A second convention was held July 28, 1915, at Reynoldsville, Penn., at which the following were elected: James Ewing, president; John B. Morton, vice-president; G. S. Stewart, secretary-treasurer; H. H. Moody, George Alexander, George N. Blackley, William E. Richard and S. E. Clark, board of directors.

The organization receives into membership mine inspectors, superintendents, foremen, firebosses, assistant foremen, mining engineers, surveyors and assistants. In the last year two deaths occurred in the membership, for which assessments of $2 per member were made. The enrollment fee is $3, and the quarterly dues $1, payable every three months. The objects of the organization are:

1. To accumulate a fund so that at the death of a member the order will eventually pay to beneficiaries a sum not to exceed $2,000. At present the amount paid on the decease of a member will be equal to an asessment of $2 for each member in good standing. When the membership reaches 1,000, the full sum of $2,000 will be paid.

2. To maintain a closer relationship between mine officials and operators the organization will endeavor to keep its members in touch with operations where foremen or other officials are needed and will at the same time furnish operators with a list of available experienced men.

These objects should meet with the hearty approval and support of all operators and mine officials. The order especially wishes to call the attention of the mine officials in the anthracite field to this order and ask them to join with it in the bituminous field to swell the ranks and influence of the organization. Any desired information will be cheerfully given by the secretary.

Who's Who in Coal Mining

C. B. Dougherty

Thirty-six years ago C. B. Dougherty came into the office of the Susquehanna Coal Co. and took a position about as low in the scale of office work as it was possible to get. He was 18 years old when he became an office boy. He is older now, 18 plus 36, and he is still in the office of the Susquehanna Coal Co., but his title has been changed to assistant manager. That old saying about the "rolling stone" seems to have been a pretty good motto in this case.

In the summer of 1885 he was made chief clerk in the manager's office when Major Irving E. Stearns became general manager of the anthracite interests of the Pennsylvania R.R. (It ought to be said that the railroad and

GEN. C. B. DOUGHERTY
Assistant General Manager, Susquehanna Coal Co.

the coal company are no longer associated as they formerly were.) In his position as chief clerk he organized the purchasing department of the coal company. Before this time all purchases had been made by the individual collieries. He still takes an active interest in the operations of the purchasing department.

In July, 1906, he was advanced to the position of assistant manager. All colliery operations are directed from the office of General Manager Quinn, and as assistant, General Dougherty has a share in the management of all departments.

Few men have been connected with the administrative side of anthracite operations for so long a time as General Dougherty, and many have been the changes that have come under his notice. To him the most notable change is that slow one from widely scattered private ownership to more concentrated corporate ownership, with the resulting change from entire lack of coördination in the activities of producers to some approach to order and regulation. Perhaps this is especially apparent to him in the operation of the purchasing department, for it is a long step from individual purchasing at each of many collieries to the purchasing for a large corporation at a central office, and probably there is no place about the operations where the economy of central management would be shown more clearly.

Here is another record, quite different but still that of the same man. Mr. Dougherty entered military life as a private in Company B, Ninth Infantry, in 1881. He was soon made regimental clerk, and a year later he became principal musician. In 1883 he was appointed sergeant major and reappointed in the two succeeding years. In 1887 he became first lieutenant and inspector of rifle practice. In 1892 he was elected major in the Ninth Infantry, and 1894 he became lieutenant colonel. In 1897 he became colonel.

In 1898 the regiment was mustered into the service of the United States. For a considerable time Colonel Dougherty was in command of the Third Brigade, Third Division, First Army Corps, and was in command when his regiment was mustered out.

In 1899 the regiment was reorganized and reëntered the service of the National Guard of Pennsylvania. In 1906 Colonel Dougherty was appointed brigadier general, and in 1901 he was appointed major general to command the division.

General Dougherty is a thirty-second degree Mason, a member of the Westmoreland and Franklin Clubs of Wilkes-Barre, the Scranton Club, the Engineers' Society of Northeastern Pennsylvania, the Wyoming Valley Country Club, the Pennsylvania Society of the Sons of the Revolution, the Military Order of Foreign Wars and the Naval and Military Order of the Spanish American War. He was first state commander of the last organization. He is serving his third term on the State Armory Board. For three successive years he has been president of the National Guard Association of Pennsylvania.

In spite of all this he finds time to do his work for the coal company, read the *Atlantic Monthly* and live up to his reputation as a tip-top good fellow and a friend worth knowing.

Invention for Safety First

An invention to be used for the motion-picture campaign in behalf of "safety first," which has been initiated among its anthracite miners by the Delaware, Lackawanna & Western Railroad Co., is a projecting machine that can be used for either lantern slides or films with both direct current and storage batteries. This will enable the safety-first organizations of the company to take the pictures right into the miners' homes.

In addition to the safety-first organization of the officials of the coal-mining department there is a separate organization among the safety inspectors, driver bosses and firebosses, which holds its separate meetings and periodic discussions of the ways and means of preventing accidents.

While the increase in the use of electric lighting has been rapid in the anthracite region, there are still many miners' houses without electric wiring, and the new projecting machine—the only one of its kind—facilitates exhibitions in every community, whether supplied with electric current or not. It enables the safety organizations to show the miner's wife and children the perils to which he exposes himself if he is in any degree reckless, and the miners pay heed to these warnings. The company's motion-picture play entitled "The Price of Carelessness" is an impressive exhibition of this sort.

Editorials

Starting the New Year

Right now when we are on the eve of another year is the time to make new plans, with the idea of increasing our efficiency and thereby improving our prospects of success. The mistakes we have made are now entered on the ledger of experience, and our resolutions include a determination to avoid the same error again.

The Foreword in this issue of *Coal Age* suggests that we record our new resolutions and that we make them only after the most mature deliberation. The chief idea is to keep all our promises, for a good resolve broken is an act that will seriously impair the will. On the other hand a good resolution when kept produces a new habit, and a new habit soon becomes a part of oneself.

It isn't our own experiences alone that should profit us, but the experiences of others who have met and conquered the same problems we meet in our everyday life. For this reason the present moment is an excellent time to ponder on the wisdom of men who have succeeded.

It was Franklin who said, "Being ignorant is not so much a shame as being unwilling to learn." He was a plodder and was able to do so much mental labor because of the simple life he led. Like most great men who lived to an old age, he was a careful eater and a small one. He remarked once, "I have seen few die of hunger; of eating—100,000." It was also Franklin who wrote, "If you know how to spend less than you get, you have the philosopher's stone."

Of all the great merchants America has produced Marshall Field stands preëminent as a man who was not only a financial success, but who was a success from all moral and human standpoints. His twelve rules of life were:

Remember—

1. The value of time.
2. The success of perseverance.
3. The pleasure of working.
4. The dignity of simplicity.
5. The worth of character.
6. The power of kindness.
7. The influence of example.
8. The obligation of duty.
9. The wisdom of economy.
10. The virtue of patience.
11. The improvement of talent.
12. The joy of originating.

Marshall Field went to Chicago practically penniless, but he was determined to succeed and made it the rule of his life to keep away from all associates who might discourage him. He learned early in his career that the cornerstone of any honored life must be a good reputation.

If we don't avoid small faults, little by little we fall into greater. It isn't only the hours that we spend at our labor that influence our lives. The way in which we spend our hours of freedom either increases or decreases our personal efficiency. It should never be forgotten that the great combat of our lives is the fight to overcome ourselves. Therefore let us all write down our new resolutions, and let these new resolves cover those faults in our personal conduct that are keeping us back and in many cases dragging us down. There is nothing more terrible than the cry of the man in his old age—If I had only done the things I should have done.

"He missed his opportunities!" How often we hear this expression. No act or accident of a man's life is insignificant; the most trifling may be the germ of his destiny. Opportunities are not as common and frequent as milestones by the roadside; however, there is always something to be done that is awaiting the coming of somebody who can do it well.

Steam-Shovel Methods

When the United States Geological Survey published its "Production of Coal in 1913," there was no mention of steam-shovel mining, but in the record for 1914 this information is available. Of course only the concerns which are mining coal for sale have furnished data, and only the bituminous coal mines are included. But in these pits it is noteworthy that the ratio of cover removed to coal obtained is six to one. In Illinois the ratio is 3.86 only, but in Oklahoma, where the coal is only 22 in. thick, the cover removed is 10 times as thick as the coal uncovered.

Steam-shovel mining has been received with the utmost scepticism, but once adopted it has a way of spreading fast. There are now 48 shovels at work in the bituminous mines alone, 40 of these operating on the cover and 8 on the coal. The strip pits did not work quite as regularly as the average bituminous mine, the former working 187 days and the latter 195. But the output per man was large nevertheless. The average for all the strip-pit workmen was 945 tons per year, or 5.06 tons per working day. The average bituminous-mine worker last year produced only 724 tons, or 3.71 tons for every day that he worked. Both mine worker and strip-pit employee failed to reach a maximum yearly tonnage owing to the state of the market.

The steam shovel has come to stay, and there is no reason why it should be used only in Illinois, Kansas, Missouri, Indiana and Oklahoma. It is well suited to mining along the outcrops of hilly countries; it is available where coal is found in basins beneath prairie ground. The seams of coal now being uncovered in bituminous practice are thin, nowhere exceeding 6 ft. in thickness, and the cover removed is nowhere in excess of 26 ft., but there is nothing to prevent greater depths of cover from being shoveled away where the coal is thicker and of more value as in the anthracite region—nothing, that is, but the fact that the strip-pit industry is in its infancy and few seem disposed to give it the favorable consideration it deserves.

Conspiracies Against the West Virginia Coal Trade

Governor H. D. Hatfield spoke most forcibly at the recent meeting of the West Virginia Coal Mining Institute. He bitterly denounced those who protested against his pet legislative schemes. But is it not to be presumed that the coal operators of West Virginia have a right to protest even against a real governor if they think his schemes are opposed to their own or the public good?

We do not suppose there is any state in the Union where an outcry would not arise if a tax was about to be laid upon coal in that state and not in all those competing. Nor is it unnatural that coal operators who for two years have run their mines on a narrow margin are disposed to protest against more drastic laws. Moreover, it is permissible for operators to seek a workmen's compensation law which will not be too severe. But apparently Governor Hatfield thinks that protests of the kind mentioned are a veritable evidence of depravity.

There is no need for vehemence such as Governor Hatfield showed, nor any need at all for vindictiveness. There is a great need, however, for that broad cosmopolitanism that realizes that two thoughts entirely different and contradictory may be held without involving bitter controversy and suspicion.

In fact there are people in West Virginia today who regard as a conspiracy every act and the expression of every opinion inimical to them. They are particularly sure that this is true if the critic or the corporation does not reside in the state.

For instance, Colonel Dawson in his address before the State Board of Trade of West Virginia at Fairmont declared that he regarded the tearing up of sidetracks under coal tipples, the arbitrary refusal of needed cars and other like acts in the years 1900 and 1904 as evidences of a conspiracy in favor of Pennsylvania and Ohio and against West Virginia. But these same illegal acts were quite common at one time in Pennsylvania before West Virginia was an important coal-producing state. Perhaps because there were no West Virginia mines was why Pennsylvania operators put a different interpretation on the actions of the railroads and alleged that the cause of these remarkable interferences with business was that the railroad officials wanted a part in the development or the exclusive control of all the mines on the railroad. Only in West Virginia have these actions been declared to be attempts to enrich one state at the expense of another.

Then again Colonel Dawson declares that the Chesapeake & Ohio Ry. is willfully preventing West Virginia coal produced along its lines from reaching Eastern cities. A glance at the map would readily show why that railway demands rates which prevent the operators along its lines from competing in the East with the much nearer and equally desirable coal of the Clearfield, Cambria and Somerset fields of central Pennsylvania.

In fact the main conspiracy to which Colonel Dawson has referred may be found devoid of irregularity in a court of law.

It is hard to believe that in a free country it is a conspiracy to agree to ask a public commission to increase freight rates. Surely when that principle is established it will be a crime for citizens to meet and agree to urge the passage of a law. But it seems improbable that the Interstate Commerce Commission will allow railroad rates to be raised in West Virginia and in Pennsylvania, even despite the now more favorable attitude of the public. In fact it looks as if the whole project may fall to the ground and as if the matter is but a "colossal bluff" to induce Ohio operators and miners to relinquish their action before the Public Utilities Commission. The action alleged to have been taken in regard to Pittsburgh rates appears to confirm that view.

It only remains to regret that the air is filled with rumors of conspiracies, most of which are purely figments of the imagination. Colonel Dawson, who accuses the coal operators and miners of neighboring states of entering into a conspiracy and who declares that the Pennsylvania R.R. and the Pittsburgh Coal Co. are plotting together against West Virginia, also states that "the brass collar of the Pennsylvania R.R. and its allied interests must indeed be welded (sic) strongly around the neck" of *Coal Age*.

He does indeed protest too much. Many of his arguments that there is a conspiracy are in no way conclusive, and only one has direct reference to the present situation. It is more reasonable to believe that in the three states involved and in Tennessee and Kentucky also there is no desire to put anyone out of business. There is in all a disposition to remember that an established plant must not be wrecked by inconsiderate and sudden reversions even to an equitable ton-mile basis. The vested interests of the West Virginia people need much consideration, and none can object to any success they may have as a result of the excellence of their fuel, but by ton-mile rates of exceptional liberality they should not be allowed to overrun every state east of the Mississippi. The change in rates to prevent their continual absorption of the markets of other states might well be made progressive, say 5c. per year. In this way West Virginians could slowly conform themselves to altering conditions.

With these views some will find fault. None of us is infallible. We surely should be able, however, to argue out an issue of this kind without any expression of bitterness or any imputation of bad faith.

Is this the kind of Christmas you are having in your house today? If it isn't, perhaps the fault is your own. Are you doing the best you can for the wife and kids? There is another Christmas coming next year.

Discussion by Readers

Purchase and Sale of Coal

Referring to the question of the purchase and sale of coal and the fluctuation in the price for different grades, as discussed in the last issue of *Coal Age*, page 1026, it might be of value to call attention to the practice of figuring relative prices of the different grades at the mine rather than at the destination. For example, one coal may sell at $1 per ton f.o.b. cars at the mine, while another coal considered to have a 10-per cent. greater fuel value than the first is sold at $1.10 per ton f.o.b. cars at the mine.

For the sake of illustration, suppose the consumer pays a freight of 70c. per ton. This freight is the same regardless of the quality of the coal. He therefore pays $1.70 per ton for the inferior coal at the point of unloading and $1.80 per ton for the better coal, which is a difference of only 10c. per ton, or 5.8 per cent. of the delivered price. This percentage of difference is still further reduced when the cost of unloading and delivering the coal to the firebox is considered.

In my opinion, the 10-per cent. better grade of fuel should be worth at destination at least 10 per cent. of the delivered price ($1.70), or 17c. per ton more than the inferior grade, making its price $1.17 f.o.b. cars at the mine. Even this method of estimating the price would take into account none of the economies of the better fuel by reason of the reduction in the labor required per horsepower yielded and the greater power furnished per dollar of investment.

Under the existing custom or practice, the higher the freight rate that a customer must pay on his coal the greater is the likelihood that the best fuel he can buy will prove the most economical in the end, as I know of no case where a coal dealer or operator computes his price on the cost of the coal at destination, as I have suggested. For the sake of comparison, suppose a dealer has two customers who pay 30c. and 90c. per ton freight rates respectively. Then, assuming the dealer has two grades of coal, one of which has a 10-per cent. better fuel value than the other, if the inferior coal sells at $1 per ton f.o.b. cars at the mine, the prices to these two customers for this coal at destination would be $1.30 and $1.90 respectively, while the prices of the higher-grade coal would be $1.13 and $1.19 per ton f.o.b. cars at the mine.

Here is a difference of 6c. per ton at the mine in the prices quoted to these two customers. This difference is based entirely on the difference in their freight rates, but no one can say that these prices discriminate against the man who pays the higher freight rate. It must be admitted, however, that a purchaser of coal often receives quotations from different districts involving different freight rates, and this further confuses the problem. In such case the buyer must estimate the relative merits or qualities of the different grades of coal offered and compare the price differentials, not as given f.o.b. cars at the mine, but as delivered to his coal bins. By so doing, I think he will often be surprised to learn how much cheaper a high-grade fuel sold at a higher price may prove.

We cannot blame the South American trade for standing so closely by the high-grade Welsh coal when we consider that the costs of transportation and handling together amount to several times the cost of this coal at the mine and, further, that all this cost is on a per-ton basis and not on a heat-unit or B.t.u. basis. It it conceivable that under such circumstances we might give away at the mine a mediocre coal and still our American neighbor would turn it down in favor of a high-grade coal for which he must pay $2 per ton f.o.b. cars at the mine. In so doing, we must allow he would show excellent judgment. So much per ton of coal at the mine is the logical way for the producer to sell his coal, and yet the system may often prove misleading to one who does not go into the matter thoroughly.

M. L. O'NEALE, Supt.,
Coal City Mining Corporation.
Coal City, Ala.

Correct Tipple Design

Referring to the letter of J. B. de Hart, *Coal Age*, Oct. 23, p. 683, the minor points to which he draws attention hardly merit a reply, being points in regard to which difference of opinion may exist in practice. However, for the satisfaction of interested readers I will offer a few brief explanations.

Mr. de Hart does not consider it good practice to have a topman act also as lampman in mines of 600 tons' capacity. Neither do I. Moreover, the mining laws of many states require that the topman be at his post a half-hour before the hoisting of coal begins and remain for a half-hour after it ceases, which would prohibit a topman from acting in any other capacity. It will be noticed that my article, *Coal Age*, Sept. 18, p. 450, reads, "Mines having a capacity not exceeding 600 tons, where the topman also acts as lampman," etc., which obviously does not recommend the practice.

However, there is nothing in the Mines Act of the Province of Alberta to prohibit such practice, and where the tonnage is low and comparatively few men are working, the topman can give out lamps in the morning and clean them after the men come out of the mine at night without in any way interfering with his duties as prescribed by the act. The handling of lamps, as thus suggested, has worked well in practice even to the replacing of injured lamps during working hours. No confusion has been experienced by reason of an injured lamp coming out of the mine without a check, which has been attached to the lamp given in its place, and responsibility for the damage has always been readily fixed.

There can hardly be a difference of opinion on the question of danger from spontaneous combustion owing to the storing of refuse from the tipple in the bins below the picking-room floor. These bins are only 7 ft. in depth

and must be emptied at least once a day. The worst conditions in respect to bony coal could not introduce the danger of spontaneous combustion or even cause a perceptible rise of temperature in that time.

Whenever possible it is better practice to weigh mine cars at the shaft bottom. Such a system is being introduced in many of the larger mines, especially those using machines, and it presents no difficulties in respect to properly crediting each miner with his coal.

In Fig. 3 of my second article, Sept. 25, p. 502, by a draftsman's error the forward leg of the headframe is shown as approximately parallel to the resultant of the cable stress. But the reference to this point on page 450 of the first article reads, "The forward leg of which (A-frame) is carried down to the ground outside of the resultant of the cable stress."

While writing I would call attention to the fact that in Fig. 2, page 451, the left-hand chute leading from the valve and receiving hopper should have been marked "local coal chute" instead of "scatter pan."

M. L. Hyde, Managing Director,
Pembina Coal Operators, Ltd.
Evansburgh, Alberta, Canada.

Output of British Coal Mines

Letter No. 2—Though I have not seen the paper read by Mr. Dean before the North of England Institute of Mining Engineers and referred to in the editorial, *Coal Age*, Nov. 6, p. 762, it seems to me that the statements made are far off the mark. One is led to suppose that the American coal operators are most farsighted and employ better equipment in their mines than the coal operators of Europe.

Conditions Existing in Welsh Mines

The reasons that more coal is produced per man per day in this country than in Great Britain are: (1) Because the coal here is almost universally blasted with powder. (2) The coalfields are better adapted for machine mining. (3) The coal is universally loaded into the mine cars with a shovel. Compare this with conditions as they exist in the mines of South Wales, where I gained my mining experience. In those mines all the coal is mined by pick, sledge and wedge except in the non-gaseous mines of the anthracite field. No blasting powder of any kind is used in the gassy mines. Also, it is impossible to use coal-cutting machines there because of the slips in the formation, which lie at an angle of about 45 deg.

In all steam-coal mines the miner uses a coal pan to carry his coal from the face to the "box," or car, to be loaded. He only loads lump coal, the fine coal and slack being thrown back into the gob. If miners in this country had to contend with these conditions, their output of coal would be less than that of their brothers in Great Britain because, owing to the slips in the coal and the gas pressure that greatly assists the mining, Welsh coal is more easily mined than American coal.

The Question of Mine Equipment

The suggestion of building larger equipment is idle talk, as British mines are noted for their equipment, which is uptodate and serves their conditions. No wood is used to line the shafts or in the building of engine houses and boiler plants, except for doors and flooring. I recall one company that planned to spend £200,000 ($1,000,000) in the sinking of two circular shafts 1,050 ft. deep and 21 ft. in diameter. The engine at the hoisting shaft consisted of a pair of 32-in. cylinders, while the drum was 18 ft. in diameter. Two cars of coal were hoisted at a time, each car containing from 3,000 to 3,500 lb. of coal. The mine employed 1,400 men, 500 of whom were night men, although no coal was hoisted at night, these men being employed as laborers and in making repairs. It was expected to hoist 2,000 tons a day in this shaft. The same company had previously operated one house-coal and four steam-coal mines. I remember the balance sheet for one year showed an output from all these mines of over 1¼ million tons and an average profit of 48c. per ton.

Natural Conditions in the Mines

I want to ask why the companies should provide larger boxes for loading hand-picked coal. Would the miners load more coal? But the larger boxes would require greater labor in loading and handling. When working in coal from 6 to 7 ft. thick, a good miner will load from 4 to 5 tons of coal a day, but this is lump coal and not run-of-mine.

Again, it does not follow that if the seam of coal is thin the height of the entries and rooms is correspondingly low. I worked in one mine where the coal was 22 in. thick. It was over 2½ mi. from the entrance to the inside parting in the mine. The main- and tail-rope system of haulage was employed. I do not remember that I had to stoop once in this mine, and I am over 6 ft. tall. I used to stand full height above the rail in the room. When it comes to "brushing" roof or lifting bottom to make headroom, we cannot instruct the miners of South Wales. In this mine a man and a boy would load from 70 to 75 cwt. of run-of-mine coal a day. Was it not easier to load four boxes of 18 cwt. each than, say, two boxes of 36 cwt. or one box of 72 cwt.? As a fact, the size of these boxes is estimated from the output expected from each place.

The Underground Haulage

In view of these facts, it needs no argument to prove that "rats of mules or ponies" are not used in those mines. Indeed, no mules are used underground in South Wales. The British mining law is strict in requiring that sufficient height must be maintained on all roads for the passage of horses, and any rubbing of the horses or their harness against the roof or timbers in any part of the mine would mean the conviction of the guilty parties. The type of horses employed in these mines compares favorably with the mules used in any mines in Illinois, and it is safe to say that our operators can take lessons in the stabling, care and treatment of mine animals from the South Wales mines.

Regarding Ventilation

To the best of my knowledge and experience, the "union" does not interfere with the miner with respect to the amount of coal he can load. In regard to the mines of South Wales being extremely "warm," it must be remembered that the coal lies at a greater depth below the surface, where the natural heat of the strata cannot be entirely removed or overcome by a more perfect system of ventilation, were this possible. Welsh mines are equipped with most efficient fans, and the circulation

and distribution of the air in these mines are in all respects uptodate. The water gage of 2½ to 3½ in. in those mines is not always the result of long aircourses or restricted area, but is owing to the circulation of air volumes varying from 150,000 to 250,000 cu.ft. per min. As early as 1887, and since then, the mining law of Great Britain has contained the following general rule:

> An adequate amount of ventilation shall be constantly produced in every mine to dilute and render harmless noxious gases, to such an extent that the working places of the shafts, levels, stables and workings of the mine, and the traveling roads to and from those places shall be in a fit state for working and passage therein.

Many miners who have worked in these mines and are now in this country can testify to the fact that, though much gas was generated in the mines, this law was strictly kept. The new mining law goes one step farther and reads as follows:

> An adequate amount of ventilation shall be constantly produced in every mine to dilute and render harmless inflammable and noxious gases, to such an extent that all shafts, roads, levels, stables and workings of the mine shall be in fit state for working and passing therein; and, in particular, that the intake airways, up to within 100 yd. of the first working place at the working face, which the air enters, shall be normally kept free from inflammable gas. . . .
>
> For the purposes of this section, a place shall not be deemed to be in a fit state for working or passing therein if the air contains either less than 19 per cent. of oxygen or more than 1¼ per cent. of carbon dioxide, and an intake airway shall not be deemed to be normally kept free from inflammable gas if the average percentage of inflammable gas found in six samples of air taken by an inspector, in the air current in that airway, at intervals of not less than a fortnight, exceeds ¼ [per cent.]

The law, however, provides for the exemption of a mine liable to spontaneous combustion by order of the Secretary of State on certain specified conditions. In all Welsh mines air leakages are reduced to a minimum. I fail to recall a single instance where less than two substantial wooden doors separated the intake and return airways, and frequently three separation doors would be used at the shaft bottom. The mining law provides that no two doors shall be opened at the same time in the same crosscut. These doors are built into a wall of stone or brick laid in mortar, and brattice cloth is nailed to the bottom of the door to prevent leakage at that point.

Electric Haulage Not Possible

Electric haulage in the mines of South Wales cannot be considered, owing to the danger of explosion of gas and dust. In the investigation of the explosion at Senghenydd, it was thought that the use of 9 volts for electric signaling gave too small a margin of safety, since it requires but 13½ volts to produce sparking of the wires. The rope haulage in present use must therefore continue.

I cannot see that the size of railroad cars used in Great Britain has much to do with the output of the mines. In this country the railroads build practically all the cars, and the size of the car is made with respect to the average length of fall. While it is not uncommon in this country to haul a distance of 300 mi., the longest haul in South Wales does not exceed 30 or 35 mi. The operators in that country build their own cars to suit their particular needs. They consider there is an advantage in using a small car with side doors opening outward in the middle of the car, which facilitates the unloading of the car and reduces the amount of breakage of the coal. One can hardly conceive of a car more difficult to unload than the ordinary type of car used in this country. In Great Britain cars that are to be unloaded at the wharfs are provided with end gates, which are most convenient for that purpose. The breakage of the coal is an important feature there, since the price of lump coal is more than double that of screening.

I have worked in coal mines in both countries, and while my output of coal in Great Britain ranged from 2 to 5 tons per day depending one the thickness of the seam. I have loaded 15 tons per day in Illinois, at the same time drilling and shooting the coal and clearing away slate and timbering. This difference of output is evidently not in the mine equipment, for no expense was spared in either case; it is simply owing to the difference in the natural conditions of mining coal in the two countries. It is not for us to boast of our good heritage in this country; instead, let us learn from European operators to demand a fair price for coal and not permit competition to so lower the value of coal at the mines that we are said to give it away. We must acknowledge that operators in foreign countries are as uptodate in most respects as their American brothers.

W. L. Morgan.

East St. Louis, Ill.

"Dont's" for Mine Motormen

In addition to the list of "dont's" for mine motormen given by James Thomas Reynolds, *Coal Age,* Nov. 20, p. 840, and the two suggested by Edward H. Coxe, Dec. 11, p. 984, I want to suggest two very important ones, which are as follows:

Don't get out of your motor while it is in motion and run alongside of it to clean out the sand-pipes. In doing this you may come in contact with some obstruction at the side of the road or have your fingers or jacket caught under the wheels, which might result fatally.

Don't climb over the top of your motor while it is in motion in order to fix or clean your headlight. In doing so you may strike against the roof or come in contact with a low timber or wire and be seriously if not fatally hurt.

California, Penn. William Thomas Jenkins.

Efficient Mine Foremen

Letter No. 14—There seems no end to the practical mining questions discussed in *Coal Age.* I have been much interested in reading the discussion of the "Efficiency of Mine Foremen." The views presented by different ones who have taken part in this discussion agree thoroughly with my own observations. I have had experience with various kinds of mine foremen, and while some were all you could desire or ask, others were slack in discipline and careless and neglectful of their duties. Some drank to such an extent that they lost their positions, yet all of these men retained their certificates of competency.

There are foremen at the present time who are capable of managing mines successfully and yet are seeking work, while others are wholly unfit for the positions they hold. Many foremen expect too much of their assistants and leave too much in their charge that they should attend to personally.

I regret to say that the mine foreman is not generally valued according to his ability to produce results if one might judge from the pay he receives for his services. As has been said, mine foremen are often hindered in the performance of their duties required by law because

of the lack of support given them by higher officials of the company. In the rapid advance of mining more is required of mine foremen and firebosses than formerly, as in many cases the territory in their charge is too large for them to give it the attention it should receive. The bituminous mine law of Pennsylvania requires that a second examination of every working place where men are employed shall be made during working hours by the fireboss. But how is this to be done if he is to give proper instruction to the men on his rounds? He is often delayed by assisting someone to lift a car onto the track or to sight an entry or by performing some other service that is needed. A READER.

Burgettstown, Penn.

Claims Credit for Double Entry

I am pleased to notice the consolidation of the *Colliery Engineer* with *Coal Age*, giving us a weekly mining paper in place of a monthly. I want to refer briefly to an article published in the October issue of the *Colliery Engineer*, page 142, by my old friend, Walton Rutledge, on "Early Mining in Illinois."

In this article Mr. Rutledge shows the old method of single entry used so extensively in those days. A door was placed at the mouth of each room, and when a driver was gathering the cars for a trip, these doors were open half the time. As a result the air short-circuited at that point, passing through the open door, and the faces of the rooms outby on that entry were cut off. It was a miserable system of ventilation.

At that time I was part owner and general manager of mines at Brazil, Ind. In the early eighties I went to Staunton, Ill., to take charge of mines at that place. It was there that I saw the absolute necessity of employing double or triple entries, as the mines were poorly laid out and there was about 30 acres of old workings on fire and sealed with the poorest kind of stoppings. This was the first place where I planned and instituted the double-entry system, which was at once adopted quite generally throughout the state on what was, I believe, known as the "Morris plan." I sold maps of my plans, which were sent broadcast to many mines throughout the country. Many of these maps were sold by the *Colliery Engineer*.

I notice with some regret that Mr. Rutledge failed to give me due credit for the system. The panel system that he described is nothing more than double entries driven in blocks to the boundary line, the blocks being then cut through and the panels worked back, as in long-wall retreating. WILLIAM M. MORRIS.

Colorado Springs, Colo.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

CONVERSION OF COMPOUND UNITS

In the conversion of compound units from the United States to the metric system, and vice versa, it is more convenient and saves much time and frequently avoids error arising from confusion of terms to employ a single factor. The following are the more common conversion factors:

WEIGHT PER UNIT LENGTH

1 lb. per ft.	(0.4536 × 3.28)	= 1.488 kg. per m.
1 lb. per yd.	(0.4536 × 1.0936)	= 0.496 kg. per m.
1 ton per mi.	(0.9072 × 0.6214)	= 0.5637 tonnes per km.
1 long ton per mi.	(1.016 × 0.6214)	= 0.6313 tonnes per km.

WEIGHT PER UNIT AREA

1 lb. per sq.ft.	(0.4536 × 10.764)	= 4.882 kg. per m²
1 ton per sq.ft.	(0.9072 × 10.764)	= 9.765 tonnes per m²
1 ton per sq.yd.	(0.9072 × 1.196)	= 1.085 tonnes per m²
1 ton per acre	(0.9072 × 2.471)	= 2.2417 tonnes per hectare
1 long ton per acre	(1.016 × 2.471)	= 2.5105 tonnes per hectare

WEIGHT PER UNIT VOLUME

1 oz. per cu.in	(28.35 × 0.06102)	= 1.73 g. per cm³
1 oz. per cu.ft.	(0.0283 × 35.3145)	= 1.00 kg. per m³
1 lb. per cu.ft.	(0.4536 × 35.3145)	= 16.0184 kg. per m³
1 lb. per cu.yd.	(0.4536 × 1.308)	= 0.5933 kg. per m³
1 ton per cu.yd.	(0.9072 × 1.308)	= 1.1866 tonnes per m³
1 ton per acre-ft.	(0.9072 × 8.106)	= 7.3538 tonnes per hectare-m.
1 long ton per acre-ft.	(1.016 × 8.106)	= 8.2357 tonnes per hectare-m.

It is worthy of note that **ounces per cubic foot** are equivalent to **kilograms per cubic meter,** or **grams per liter,** since 1 m³ = 1000 liters.

WEIGHT PER UNIT CAPACITY—LIQUID

1 gr. per gal.—U. S.	(64.8 × 0.264)	= 17.107 mg. per l.
1 oz. per gal.	(28.35 × 0.264)	= 7.484 g. per l.
1 lb. per gal.	(453.59 × 0.264)	= 119.748 g. per l.
1 gr. per gal.—Gt. Br.	(64.8 × 0.22)	= 14.256 mg. per l.
1 oz. per gal.	(28.35 × 0.22)	= 6.237 g. per l.
1 lb. per gal.	(453.59 × 0.22)	= 99.790 g. per l.

WEIGHT PER UNIT CAPACITY—DRY

1 lb. per bu.—U. S.	(0.4536 × 28.378)	= 12.872 kg. per stere
1 lb. per bu.—Gt. Bt.	(0.4536 × 27.51)	= 12.479 kg. per stere

PRESSURE

1 oz. per sq.in.	(28.35 × 0.155)	= 4.394 g. per cm²
1 lb. per sq.in.	(453.59 × 0.155)	= 70.306 g. per cm²
1 lb. per sq.ft.	(0.4536 × 10.764)	= 4.882 kg. per m²

WORK

1 inch-pound	(2.54 × 453.59)	= 1152.1 gram-centimeters
1 foot-pound	(0.3048 × 0.4536)	= 0.1383 kilogram-meters
1 ton-pound	(0.3048 × 0.9072)	= 0.2765 tonne-meters

The Coal Age Pocket Book

WORK IN HEAT UNITS

1 B.t.u.—778 ft.-lb.	(778 × 0.1383)	= 107.564 kg.-m.
1 pound-calorie	(107.564 × 1.8)	= 193.615 kg.-m.
1 calorie	(193.615 × 2.2046)	= 426.844 kg.-m.

CALORIFIC OR HEATING VALUE

1 B.t.u. per lb.	(0.252 × 2.2046)	= 0.55556 cal. per kg.
1 B.t.u. per lb.	5/9 (2.2046)	= 1.22478 lb.-cal. per kg.
1 B.t.u. per cu.ft.	(0.252 × 35.3145)	= 8.89925 cal. per m³
1 lb.-cal. per lb.	(0.4536 × 2.2046)	= 1,00000 cal. per kg.
1 lb.-cal. per lb.		= 2.20462 lb.-cal. per kg.
1 lb.-cal. per cu.ft.	(0.4536 × 35.3145)	= 16.01866 cal. per m³

POWER

The metric horsepower (force de cheval), which for convenience may be abbreviated **"cheval,"** is the power capable of performing 75 kg.-m. of work per second, or 75 × 60 = 4500 kg.-m. per min.

1 horsepower	(33,000 × 0.1383)	= 4563.9 kg.-m. per min.
1 horsepower	(4563.9 ÷ 4500)	= 1.0142 chevals
1 cheval	(4500 ÷ 4563.9)	= 0.986 hp.

POWER FACTORS

1 sq.ft. per hp.	(0.093 × 0.986)	= 0.0937 m² per cheval
1 cu.ft. per hp.	(0.028 × 0.986)	= 0.0276 m³ per cheval

FUEL OR WATER CONSUMPTION

1 lb. per hp.-hr.	(0.4536 × 0.986)	= 0.4472 kg. per cheval-hr.
1 ton per hp.-hr.	(0.9072 × 0.986)	= 0.8945 tonnes per cheval-hr.
1 gal. (U. S.) per hp.-hr.	(3.785 × 0.986)	= 3.7320 liters per cheval-hr.
1 gal. (Gt. Bt.) per hp.-hr.	(4.544 × 0.986)	= 4.4804 liters per cheval-hr.

EVAPORATION FACTORS

1 gal. per sq.ft.—U. S.	(3.785 × 10.764)	= 40.7417 l. per m²
1 gal. per lb. fuel	(3.785 × 2.2046)	= 8.3444 l. per kg.
1 gal. per B.t.u.	(3.785 × 3.968)	= 15.0189 l. per cal.
1 gal. per B.t.u.	(3.785 × 1.8)	= 6.8130 l. per lb.-cal.
1 gal. per sq.ft.—Gt. Bt.	(4.544 × 10.764)	= 48.9116 l. per m²
1 gal. per lb. fuel	(4.544 × 2.2046)	= 10.0177 l. per kg.
1 gal. per B.t.u.	(4.544 × 3.968)	= 18.0306 l. per cal.
1 gal. per B.t.u.	(4.544 × 1.8)	= 8.1792 l. per lb.-cal.

EQUIVALENTS IN AIR MEASUREMENTS

Atmospheric pressure, sea level, normal, 14.696 lb. per sq.in.

(14.696 × 0.0703)	= 1.033 kg. per cm²
(14.696 ÷ 0.4911)	= 29.925 in. mercury
(29.925 × 25.4)	= 760 mm. mercury
$\left(\frac{29.925 \times 13.6}{12}\right)$	= 33.9 ft. water column
(33.915 × 0.3048)	= 10.34 m. water column

The specific gravity of mercury (32 deg. F.) being 13.593, 1 in. barometer (standard reading) corresponds to 13.6 in. water gage and, roughly, to (13.6 × 815) ÷ 12 = say 900 ft. air-column.

Inquiries of General Interest

Lifting Power of Hydrogen

(a) I would like to know how much a cubic foot of hydrogen gas will lift at a temperature of 60 deg. F. and a barometer of 30 in., assuming the gas is confined in a bag and disregarding the weight of the bag. (b) Is there any gas lighter than hydrogen? STUDENT.

Enterprise, Iowa.

(a) The lifting power of any gas is equal to the difference between the weights of equal volumes of that gas and air at the same temperature and pressure. Under these conditions a cubic foot of dry air weighs 14.418 times as much as the same volume of hydrogen. Then, since 1 cu.ft. of air at 60 deg. F., barometer 30 in., weighs 0.0766 lb., the same volume of hydrogen, at the same temperature and pressure, will weigh $0.0766 \div 14.418 = 0.0053$ lb. Therefore, the lifting power of hydrogen at this temperature and pressure is $0.0766 - 0.0053 = 0.0713$ lb. per cu.ft. of the gas.

Expressed as a rule, the lifting power of any gas per cubic foot is equal to the density of the air (weight per cubic foot) at the given temperature and pressure, multiplied by one minus the density of the gas referred to air as unity. Applying this rule: The density of hydrogen referred to air as unity is $1 \div 14.418 = 0.06936$. Then, multiplying the weight of one cubic foot of air at the given temperature and pressure by $1 - 0.06936 = 0.93064$, we find for the lifting power of hydrogen at this temperature and pressure, $0.0766 \times 0.93064 = 0.0713$ lb.

(b) No; hydrogen is the lightest gas known.

Wire-Rope Formulas

Referring to the solution of the problem on engine-plane haulage, *Coal Age*, Nov. 13, p. 816, will you kindly explain the method of calculating the size of rope required when hoisting in a shaft or hauling a trip up an engine plane? Is it possible to calculate the diameter of the rope required without referring to wire-rope tables?

In the problem to which I have referred the factor of safety of 5 has been used, and I would like to ask whether this means that the safe working load of the rope is one-fifth of the breaking load or that one-fifth of the breaking load must be subtracted in order to obtain the safe working load of the rope.

D. J. BOWEN.

Lafayette, Colo.

All rope formulas for finding the safe load for any given diameter of rope or the diameter required for any given load are necessarily empirical, being based on actual tests of wire ropes of different kinds and makes. It is impossible to calculate with accuracy the load a wire rope will carry safely for the reason that the strands of the rope and the wires composing the strands are twisted, and the stress in the wires is for the most part not parallel to the axis of the rope.

In the usual makes of rope in this country the wires in a strand form an angle of about 14 deg. with the axis of the strand and the strand makes an angle of 14 deg. with the axis of the rope. Hence, the axial stress in the wire is frequently at an angle of 28 deg. with the axis of the rope. As a result the axial stress permissible in the rope would be equal to the axial stress in the wire at its weakest point multiplied by the cosine of 28 deg. (0.883), which would make the safe load for the rope, say seven-eighths of the safe wire stress calculated for the entire wire cross-section of the rope.

There are, however, other considerations in respect to wire ropes in which the twisted wires are built over a hemp core, which make it impracticable to estimate the strength of the rope except by actual test. The makers of wire rope have made such tests, and the strength of different sizes and kinds of rope is best estimated from the breaking load of a 1-in. rope of the same type.

The following table gives the breaking load of a 1-in. six-strand rope for each kind of wire and style of rope. All ropes used in mining, with few exceptions, have six strands; but haulage ropes, requiring less flexibility and subject to greater wear from exterior abrasion, are generally made of seven wires to the strand, while hoisting ropes, requiring greater flexibility and being less subjected to abrasion, are made of 19 wires to the strand, these wires being of less diameter than those used in haulage ropes:

	Breaking Load of 1-In. Rope (Tons)			
	Iron	Cast Steel	Extra-Strong Cast Steel	Plow Steel
Haulage ropes, 7 wires..	16	32	37	42
Hoisting ropes, 19 wires	17	34	39	44

Two general formulas are used—the first for ascertaining the safe load L for any rope having a diameter d and using any factor of safety f; the second for finding the required diameter d for any safe load L and factor of safety f.

The factor of safety is always the ratio of the breaking load to the estimated safe working load of the rope. Thus when the factor of safety is 5, the estimated safe working load is one-fifth of the breaking load of the rope. The following formulas assume, what is practically true, that the strength of wire rope for the same kind of material and style of rope varies as the square of the diameter of the rope; thus,

$$L = \frac{cd^2}{f} \qquad (1)$$

$$d = \sqrt{\frac{fL}{c}} \qquad (2)$$

In these formulas the load L is in tons, the diameter d in inches, while the rope constant c is taken from the table for the kind and style of rope used. The factor of safety commonly used in mining practice is $f = 5$. However, for hoisting in deep shafts, on steep inclines or when ropes are used under particularly severe conditions of wear or erosion from the acid mine water, a higher factor of safety should be employed.

Examination Questions

Iowa Foremen's Examination, Des Moines, Nov. 9-10, 1915

(Selected Questions)

Ques.—An aircourse in a mine is 5x7 ft. in area and 5,000 ft. long. What horsepower would be required to drive a fan to supply air for 100 men, assuming the air requirement is 100 cu.ft. per man per minute and the fan has an efficiency of 65 per cent. Assume the coefficient of friction $k = 0.000000022$.

Ans.—The volume of air required is $100 \times 100 = 10{,}000$ cu.ft. per min. The sectional area of the airway is $a = 5 \times 7 = 35$ sq.ft., and the rubbing surface $s = 2\,(5 + 7)\,5{,}000 = 120{,}000$ sq.ft. Then, taking the efficiency of the fan as 65 per cent., as stated in the question, the horsepower required to drive the fan is

$$H = \frac{ksQ^3}{0.65 \times 33{,}000\,a^3}$$

$$= \frac{0.000000022 \times 120{,}000 \times 10{,}000^3}{0.65 \times 33{,}000 \times 35^3} = 2.87\ hp.$$

Ques—What advantages has machine mining over shooting off the solid?

Ans.—When mined by machine, a less weight of powder is required to break down the coal than when it is shot off the solid. In the former case the charge of powder is given a better opportunity to perform its work and there is less danger of the occurrence of a blown-out shot. A larger quantity of coal is produced per pound of explosive used. Also a larger percentage of lump is produced by mining the coal.

Ques.—If you were put in charge of a mine that was not properly ventilated although the fan was of ample size to furnish all the air required, what would you do to correct the trouble?

Ans.—First, examine carefully the plan of ventilation and note the course of the air current in its passage throughout the mine. The chief trouble is probably owing to the leakage of air through the stoppings. These should be carefully examined, and air measurements taken in the entry all the way from the foot of the downcast shaft to the last crosscut on each pair of entries or section of the mine. All obstructions should be removed from the airways and crosscuts, and all breakthroughs should be enlarged so that they will have an area at least equal to the sectional area of the airway. Wherever the air current does not sweep the working face, brattices should be built so as to conduct the air forward to the face of the room or the head of the entry. If abandoned places are found to be giving off gas, these should be properly ventilated or sealed off by air-tight stoppings. Wherever practicable, the course of the air current should be shortened and sharp bends and angles in the airway should be avoided.

Ques.—Explain how you would erect a permanent stopping, giving the reason for your selection of the material used in its construction.

Ans.—A permanent stopping should be built of material that will withstand the action of the air current and be sufficiently strong to resist the action of the roof. The choice of material will depend largely on conditions in the mine. Where suitable rock or slate is available, the stopping is often built by erecting a double wall of this material and filling the space between with road dust or other fine material at hand. Where good hard brick can be obtained at a small cost, it is often best to build the stoppings of brick laid in cement mortar. A single wall of brick 18 in. thick when well laid makes a good stopping. In building a stopping, the floor should be cleared so as to provide a level bearing and the ribs should be cut at each side so as to give a good joint. Any loose top should be removed and the stopping carried up to the roof and carefully sealed.

Ques.—If you were put in charge of a small mine and were required to do your own surveying and mapping, explain how you would locate the underground workings with respect to the surface and what system you would employ in putting up sights.

Ans.—The best method to adopt in connecting the underground survey with that on the surface is to use two plumb lines, one in each shaft, connecting these by running a traverse on the surface and underground. If the traverse is properly calculated, it will give the length and direction of the base line joining the two plumb lines, which forms the base line of the survey.

When running the survey underground, an approximate course is determined by observing the needle reading on two or more courses of the survey. The needle bearing is then corrected by the calculated direction of the base line of the survey, and this correction is applied to all the courses of the underground survey.

When it is not practicable to use plumb lines in two separate shafts, the course of the underground survey is found by dropping two plumb lines in the same shaft and determining the direction of the line joining them on the surface, which gives the direction of the same line underground. In the use of this method greater care is required to avoid error, as any slight deviation caused by the swinging of the plumb lines will be greatly exaggerated as the survey is extended in the mine.

Ques.—A fan driven by a steam engine supplies air in a mine through several miles of aircourse. A door is suddenly opened allowing the air to go directly from the air shaft to the escape shaft. Will the opening of this door cause any change in the operation of the fan? Give the reason for your answer.

Ans.—When the air current is short-circuited by the opening of the division door between the main intake and the return airway, the resistance of the mine is cut off, and as a result a larger volume of air at once rushes through the fan. This rush of air causes a greater absorption of work within the fan, and the speed of the fan is reduced, assuming the power applied to the fan shaft remains unchanged.

Coal and Coke News

Washington, D. C.

The opening of Congress has brought with it the usual crop of bills relating to mining of all kinds. Those introduced in the House of Representatives and some of those in the Senate are now available in printed form and include some familiar proposals renewed from past sessions as well as several new ones. Among those now receiving attention are Nos. S. 51, 725, 1772 and H. R. 4669 and 294, providing for the establishment of mining experiment stations at various places, all of which have been referred to the Committees on Mines and Mining. Four bills, H. R. 18, 6043, 5802 and S. 52, call for the creation of a commission to codify and suggest amendments to the general mining laws. Two measures, S. 775 and H. R. 174, relate to mining for radium and its regulation; bills S. 50 and H. R. 671 call for the use of a portion of the proceeds of the sales of public lands to aid the endowment of schools or departments of mines.

Senate bill No. 776 provides for the amendment of the revised statutes so that Sections 2347 and 2348 shall read:

Section 2347. Every person above the age of 21 years, who is a citizen of the United States, or who has declared his intention to become such, or any corporation organized under the laws of the United States, or of any state, or municipality, or municipal subdivision of any state, shall, upon application to the register of the proper land office, have the right to enter, by legal subdivisions, any quantity of vacant coal lands of the United States not otherwise appropriated or reserved by competent authority, not exceeding 1,280 acres upon payment to the receiver of not less than $10 per acre for such lands, where the same shall be situated more than 15 mi. from any completed railroad and not less than $20 per acre for such lands as shall be within 15 mi. of such road.

Sec. 2348. Any person, or any corporation organized under the laws of the United States, or of any state, or municipality, or municipal subdivision of any state, as above provided, who has opened and improved, or shall hereafter open and improve, any coal mine or mines upon the public lands, and shall be in actual possession of the same, shall be entitled to a preference right of entry under the preceding section, of the mines so opened and improved.

H. R. Bill No. 531 provides for a change in modes of government purchase of coal and reads in part as follows:

That all wood, coal, oil, gas or other fuel to be purchased and used by any executive department or independent establishment at the seat of government or elsewhere, except necessary emergency purchases in open market, shall be selected, purchased or contracted for in accordance with the recommendations of and under the specifications prepared by the Bureau of Mines.

Section 2. That it shall be the duty of said bureau from time to time to investigate the fuel-burning equipment used by any such department or independent establishment, the methods of purchase and manner of handling, storing and using fuel, and to recommend to such department or independent establishment such changes as will result in the greatest economy to the Government, and to submit a report to Congress, through the Secretary of the Interior, at the beginning of each regular session, setting forth all such recommendations and the results of its operations hereunder.

Sec. 3. That each said department and independent establishment shall, upon request, furnish reports to the Bureau of Mines, in manner and form to be prescribed, relating to fuel consumption, character of fuel-burning equipment, and such other information as may be deemed necessary for the proper and economical selection and use of fuel.

There is as yet no indication of the prospects of these and several other measures, regular and continuous work not having as yet been undertaken by Congress.

HARRISBURG, PENN.

The Reading company and its subsidiaries, comprising the so-called "anthracite coal trust," obtained an appeal on Dec. 18, from Judges Buffington, McPherson and Hunt, in the United States District Court, to the Supreme Court from its decision that certain of the defendants to the action were violating the law.

While the ruling of the court was a victory for the alleged illegal combination, the court found that the business ramifications of the Philadelphia & Reading Coal and Iron Co., the Lehigh & Wilkes-Barre Coal Co. and the Central R.R. of New Jersey were not in accordance with the letter of the law, and ordered the Central company to dispose of its stock in the other concerns. The Government took a general appeal from the entire decision in the anti-trust suit, and the defendants now want the Supreme Court to set aside the finding in so far as it relates to the above concerns.

Insurance Rates Will Probably Be Completed

The State Insurance Fund Board, which has invited representatives of every coal company operating in Pennsylvania to meet its members at the Capitol will probably complete its rates for insurance or coal miners in the state fund within the next week. The officials of the fund have been securing data on accidents in coal mines in this and other states and a number of special investigations have been made with a view of meeting certain phases encountered in some of the larger mines.

The State Compensation authorities have had meetings with representatives of the railroads and the big steel and manufacturing concerns of the state and efforts will be made to secure the hearty coöperation of the coal operators. The State Insurance Fund officials will make efforts to induce some of the coal operators to insure in the state fund instead of carrying their own insurance as the railroads and big steel companies intend to do.

The meeting with the coal operators will bring together men whose operations mean over $100,000,000 in wages and a big effort will be made to win them to the state fund. James W. Leech, chairman of the Compensation Board, and Albert L. Allen, assistant manager of the state fund, will be the speakers, while the counsel for the board will be present.

The rates for insurance in the state fund, which may be made 10 per cent. lower than those of any other insuring agency, are to be issued generally as fast as they can be printed and bound.

The board has formally exempted a number of coal companies from necessity of taking out insurance to cover claims under the provisions of the Compensation Act. All these companies convinced the board of their financial ability to meet any liabilities which might be incurred under the law, the board retaining the privilege of revoking its action at any time.

The coal corporations granted self-insurance are:

United States Steel Corporation (H. C. Frick Coke Co.); W. J. Rainey; Connellsville Coke; Morris Run Coal Mining Co.; Manor Gas Coal Co.; Penn Gas Coal Co.; Westmoreland Coal Co., and the Lehigh & Wilkes-Barre Coal Co.

PENNSYLVANIA

Anthracite

Pittston—The Pittston Mining Institute is this term carrying out a remarkable course of practical demonstrations of the correct and incorrect methods of mining. A series of demonstrations of methods of setting props has been completed and on Monday night the first demonstration of the use of explosives was given. Mine Inspector Samuel J. Jennings, Eighth anthracite district, is conducting the demonstrations and giving the lectures.

In pursuance of its policy to make frequent transfers of officials to acquaint them with conditions existent in different mines, the Pennsylvania Coal Co. is preparing to transfer a number of its mine foremen soon. The list has not yet been completed, Superintendent Jennings stated. Four transfers of colliery superintendents, made Dec. 15, are as follows: John Brown, from No. 14 to No. 6; Benjamin Milton, from No. 6 to Erie; Edgar C. Weichel, from Underwood to No. 14; William Jeffries, from Hoyt colliery to Underwood.

Pottsville—Judge Brum, on Dec. 15, started hearing testimony in the suit of the Home Brewing Co., of Shenandoah, to prevent further undermining of its property by the Thomas Colliery Co. Archbishop Prendergast is also a complainant because the $80,000 church of St. Casimer is threatened. Testimony showed that the Philadelphia & Reading Coal and Iron Co. has also undermined that section.

During a single day recently the Philadelphia & Reading Coal and Iron Co. loaded 1,700 cars of coal, and this number would have been even greater if several collieries had not been shut down for the lack of cars.

Drifton—Erection of a new mine hospital for the Eckley Colliery of the Coxe Brothers & Co., Inc., is now near completion. This mine station for the care of the injured will be fitted up with the latest appliance along this line. The addition to the equipment of the colliery is an excellent one.

Lattimer—The fire that broke out in the No. 9 slope of Pardee Bros. & Co. on the night of Dec. 13, has proven more extensive than at first thought, and, on Dec. 18, the Hazleton Fire Department gave the use of firemen's helmets for the men fighting the flames, which are hard to approach. A mine-rescue car is at the colliery and a doctor is on almost constant emergency duty. Twenty-three men were partially overcome on Dec. 17 with gas fumes.

Wilkes-Barre—F. M. Chase, general manager of the Lehigh Valley Coal Co., on Dec. 18, announced plans for the biggest employees' welfare movement ever attempted in the history of anthracite-coal mining. The scope and measure in Mr. Chase's creation are revolutionary in extent and character. It provides for free medical attendance and visits and instructions by professional nurses for 20,000 employees and their families to a total of approximately 100,000 men, women and children. The welfare plan will go into effect on Jan. 1. Its estimated cost is $50,000.

State College—The instruction car of the Bureau of Mines has been here for the past week training the students in the mining-engineering department in rescue work. As a result 19 men have been awarded certificates qualifying them as proficient in mine-rescue and first-aid work. One of the tests to which the men were required to submit themselves was to remain with respirators on in a tunnel filled with poisonous sulphur dioxide gas for over 10 hr.

Shamokin—Finding something wrong with his safety lamp recently, a miner in a colliery of the Susquehanna Coal Co. at this place took it apart and as a consequence the naked flame set fire to a pocket of gas, severely injuring several men.

Shenandoah—All the mines in this region are experiencing difficulty in reaching their maximum capacity in the outturn of tonnage, due to the lack of cars. Recently seven collieries suspended operations for one day from this cause.

Bituminous

Hastings—The Oak Ridge Coal and Coke Co., which lately purchased 1,200 acres of the B, or Miller, vein of coal around its plant here, has already started the sinking of an additional shaft. The coal trade in the northern part of Cambria County has reached such a stage that it is absolutely necessary to open new operations to meet the demand.

Charleroi—One of the largest coal-land deals consummated in western Pennsylvania in many years was recently closed, when the Youghiogheny & Ohio Coal Co. purchased from the Carnegie Coal Co. what is known as the Charleroi plant of the Carnegie company. The purchase price was $1,400,000. The property is situated along the Monongahela River, and consists of 1,100 acres. The Youghiogheny company is one of the largest coal companies in the Pittsburgh district, with extensive holdings in Washington, Green and Westmoreland counties. It also operates in Ohio.

Pittsburgh—Rains in the upper valleys and melting snow has begun to swell the Ohio to a shipping stage, and coal shippers are preparing to take advantage of the expected rise. Coal will be shipped to Louisville and New Orleans to an anticipated total of more than a million bushels provided that the coal shipping stage materializes.

New Carrolltown—The Watkins Coal Co. has completed the installation of a new coal conveyor at its operation between Bakerton and Spangler. This conveyor obviates the dumping of coal by hand and will increase the output of the mine from 100 to 200 tons.

Jeanette—The first train, four cars of coal, from the Delmont Gas Coal Co., was recently hauled over the Delmont spur of the Turtle Creek branch of the Pennsylvania R.R. This new branch of the Turtle Creek road runs within ½ mi. of Delmont into territory operated by the Delmont company and the New York and Cleveland Coal Co.

Uniontown—Dr. S. B. Hess and S. A. Carson were recently appointed receivers for the Harris-Smith Coal and Coke Co. The receivership was granted on the petition of the Browning Coke Co. and Lloyd H. Smith to cover an indebtedness of $30,000, representing a mortgage of the corporation in Franklin Township of Fayette County. The unsecured debtedness is $44,500 and the assets are $3,988.

Connellsville—The production of coke for the Connellsville region recently amounted to somewhat over 450,000 tons per week, being a gain of almost 15,000 tons over the preceding week. Shipments for the week were about 700 tons less than the production.

WEST VIRGINIA

Huntington—Officers of the Raleigh Coal and Coke Co. recently dedicated a handsome new theater building to their employees at Raleigh. This theater was recently completed at a cost of $20,000 and will be used entirely for the benefit and amusement of the company's employees.

Fairmont—Work was recently begun by John M. Kisner & Bro. on the construction of an engine and boiler house and supply house for the Consolidation Coal Co. at its Ida May mine in the Helen's Run field. This engine and boiler house will be 40x90 ft. in dimensions and will be strictly fireproof, while the supply house will be of wood 14x40 ft. with a large loading platform on each side.

Clarksburg—Coal operators who met recently with A. W. Thompson, vice-president of the Baltimore & Ohio R.R., received little encouragement from that official in regard to the car supply. He stated that the company is manufacturing about 100 new cars per day, but this so far has served but little to relieve the shortage.

Charleston—By providing compensation in the cases of families of two of the victims of the Boomer mine disaster within 17 days after the occurrence of the fatalities, the Workmen's Compensation Department recently established a record. The families of the other 21 victims of the explosion will be cared for as rapidly as possible.

Cautionary notices accompanied by a list of the employees killed in the mines of the state during the month of November and the immediate and contributing causes, are included in data being mailed out by Chief Henry of the Department of Mines to every section of the state. Mr. Henry's circular letter calls attention to the accidents during the month of November, when 23 men lost their lives through falls of slate or coal. These, Mr. Henry believes, could have been reduced in number by the exercise of more care by the men and the mine bosses.

KENTUCKY

Lexington—Twenty-nine foremen were given certificates, 19 first-class, 8 second-class and 2 third-class, as a result of the examination recently conducted here at the School of Mines and Metallurgy.

Louisville—The finished draft of the proposed Workmen's Compensation law was considered by the executive committee of the Kentucky Mine Owners' Association at a recent meeting in Louisville, at which it was proposed to call a meeting of the association for the first week in January for further consideration of this and other matters. Members of the Executive Committee generally approve the law which was in part a work of Kenneth U. Meguire, president of the Harlan Coal Co., and C. W. Taylor, of Greenville, who represented the coal interests on the commission. Eight members of the executive committee were in attendance.

OHIO

Columbus—In his campaign to prevent many of the mining accidents in Ohio, J. M. Roan, Chief Deputy and Safety Commissioner of Mines, has issued a pamphlet printed in all languages spoken by Ohio miners, containing excerpts of the mining laws of the state. Stress is being placed on the enforcement of discipline in and about the mines by the mine management. It is the opinion of Mr. Roan that practically every fatal accident could be prevented by the proper obedience to the mine laws.

ILLINOIS

Duquoin—Work is expected to begin in the early spring on the electric line that is to belt the coal districts of Franklin and Williamson counties, in southern Illinois. The proposed line will connect Marion, Johnston City and Herrin in Williamson County with Benton in Franklin County and Harrisburg in Saline County. The enterprise is controlled by the Schott interests of New York, who now have a line in operation between Eldorado and Harrisburg.

Edwardsville—One of the largest personal injury verdicts recorded in years was recently returned by a jury in the Circuit Court here against the Madison Coal Corporation of St. Louis. The judgment is for $15,000, in favor of John Wendzenski, of Glen Carbon, for the loss of his eyes by a premature explosion in the company's No. 2 mine, at Glen Carbon, in October, 1913. Attorneys for the company filed a motion for a new trial.

IOWA

Des Moines—There is a prospect of a new coal field being opened in 1916 in Hardin County. Coal beds of good thickness have been located and a company with ample capital is investigating the field.

Prospectors are at work on the Henry Carlock farm in Indian Creek Township in the hope of locating a vein of coal thick enough to warrant mining. Former prospects showed a good coal bed in that section, but it is not certain the roof is thick enough to withstand propping.

Mine No. 10 of the Phillips Coal Co., in Dallas County which was closed on order of the state mine examiner, is still idle. The company had tunneled under the river to tap a coal field on the other side. The examiner demanded that the operations cease until a new escape shaft was provided on the other side of the stream. The company has not yet complied.

COLORADO

Denver—The state coal-mine inspector reports that not a single fatal accident occurred during November in a Colorado coal mine, this being the first instance of the kind in 17 years. It is attributed to the enforcement of stringent "safety-first" rules and the employers' liability law.

WASHINGTON

Zillah—Two bodies of anthracite coal were discovered recently on the farm of W. M. Ludvig while he was drilling for a well. The first coal bed is 8 ft. thick, under which was found 7 ft. of blue slate clay which separated the two beds of coal. The second measure is 4½ ft. thick. The Northern Pacific R.R. Co. is making an analysis.

Seattle—As a result of the recent accident at the Ravensdale mine, owned by the Northwestern Improvement Co., a subsidiary of the Northern Pacific Ry. Co., in which 31 men were killed by an explosion of coal gas, officials of the company have announced that the ill-fated property will be abandoned. The announcement was made after it had been determined that the mine timbering and machinery had been so wrecked by the explosion and the mine made so generally unsafe that it would cost more to repair the damage than it would to open a new mine. The company has other coal lands in the same section and will start development work at once.

PERSONALS

John S. Healy, former general manager of the Davis Coal and Coke Co., has accepted a position with the Chesapeake & Ohio R.R. Co.

R. P. Curry, who has been a traveling salesman in eastern Kentucky for 26 years, has taken the management of the commissary of the Hazard Coal Co., at Hazard, Ky.

George M. Crokey, of Toledo, Ohio, has been appointed receiver of the Indian Guayan Coal Co., which operates mines in Gallia County, Ohio. The property was ordered sold on Dec. 22.

Oliver H. Hughes, a member of the Ohio Public Utilities Commission, retired recently because of the expiration of his term. Several prominent men are mentioned for the position.

E. A. Purkey, superintendent of the Antler Coal Co.'s mine at Round Bottom, has resigned to take charge of a mine for the Tyrconnell company at Rosemont. He will be succeeded as superintendent at Round Bottom by Bob Pollock.

The Bureau of Mines has appointed Dr. A. F. Knoefel, of Terre Haute, Ind., in charge of the first-aid work of the Indiana bituminous-coal operators' association, as a member of an advisory committee to aid in standardizing first-aid work throughout the country.

Peter McGovern, mine foreman at Warrior Run Colliery, of the Lehigh Valley Coal Co., has resigned, following his appointment as an inspector with the Associated Companies of Workmen's Compensation Insurance. His new position will require him to travel over a large territory inspecting working conditions and safety appliances.

Thomas Madden, a fireboss in No. 9 colliery of the Pennsylvania Coal Co., for an act of heroism performed three years ago, recently received a check for $1,000 from the Carnegie Hero Fund. Mr. Madden, while a fireboss in No. 14 colliery, made his way to a number of men who were overcome by blackdamp following an explosion. He made two trips to the dangerous workings. A short time after the explosion he received a Carnegie Hero medal.

OBITUARY

Col. Michael P. Gannon, aged 72 years, recently died at Westernport, Md. Colonel Gannon was extensively interested in the mining of coal in Maryland and West Virginia, and was also connected with several banking institutions in an official capacity.

Frank Howard Bailie, for 27 years assistant manager of sales for the H. K. Porter Co., died recently after a brief illness from pneumonia. He will be greatly missed by his past employers, and many correspondents who have been his personal friends.

Abraham Overholt Tinstman, one of the oldest coke manufacturers in Pennsylvania died of pneumonia recently at his home in Turtle Creek. Mr. Tinstman was born in East Huntington Township, Westmoreland County in 1834. In 1865 he, with Joseph Rist, purchased 600 acres of coal land in the Connellsville coke region and a short time later, they, together with A. S. M. Morgan, organized the firm of Morgan & Co., erecting 111 ovens at Morgan Mills in Fayette County. In 1870 Mr. Tinstman organized the Mt. Pleasant & Broadford R.R. Co. In 1871, H. C. Frick was engaged by Mr. Tinstman's grandfather, A. Overholt, at Broadford as a bookkeeper. His business ability, however, caused Mr. Tinstman and his partner Mr. Rist to take him into their business. Mr. Tinstman and his partner later organized the Frick Coal and Coke Co., Mr. Frick holding some stock. The company purchased 200 ovens at Broadford and 100 at Mt. Pleasant. In 1873, Mr. Tinstman met with financial difficulties and in 1876 lost everything. Within a year, however, he had obtained an option on 3,500 acres of coal land in the Connellsville district and sold the land at a large profit. He then organized the Connellsville Coal and Iron Co., and in 1880 established the A. O. Tinstman Co., of Pittsburgh. In 1881, he purchased the Mt. Braddock Coke Co. and the Pennsville Coke Co. A few years later he sold all his holdings and engaged in buying and selling coal lands until recently when he retired.

INDUSTRIAL NEWS

War, W. Va.—The Elkhorn Coal and Coke Co. will shortly install an electric plant at its coal mine to cost about $8,000.

Pittsburgh, Penn.—The Concordia Safety Lamp Co., Inc., has recently moved its office to the Fulton Bldg. in Pittsburgh.

Gary, W. Va.—The United States Coal and Coke Co. recently fired up 1,700 ovens, and is now calling for 1,000 men for work on the coke yards and in the mines.

Des Moines, Iowa—Operators report to the state department they are not hampered to any extent by car shortage and have been doing a fine business this fall.

Huntington, W. Va.—It is reported here that a new coal mine will shortly be opened at Glenhayes, Wayne County. It is thought that extensive operations will be begun shortly in that neighborhood.

Fargo, N. D.—The Standard Coal Co., of Beulah, Mercer Co., was recently incorporated with a capital stock of $25,600. The incorporators are George G. Schmidt, Marguerita Schmidt and Phillip Schmidt, all of Beulah.

Hamilton, Ohio—It is stated that the Hamilton Otto Coke Co. with a plant at Cokotto is planning to erect an addition at a cost of $80,000 for the extraction of various by-products, chief among which are light oils.

Indianapolis, Ind.—The Robinson Mining Machine Co. has been organized at Indianapolis with $10,000 capital stock. It will manufacture mining machines. The directors are Lige Robinson, Oliver Williamson, E. M. Shorter.

Beckley, W. Va.—The Prince-Wick Coal Co. has been incorporated here with a capital stock of $100,000, by Prince E. Lilly, Thomas H. Wickham and others. The company has interests in this vicinity, and proposes to open up several mines this spring.

Norfolk, Va.—In October the Chesapeake & Ohio Ry carried 2,176,990 tons of coal, being an increase of 149,11[illegible] over the same month of 1914. For the four months ending with October, the road showed an increase of 649,326, or a total coal tonnage of 9,636,309.

Lansford, Penn.—It is the intention of the Lehigh Coal and Navigation Co. to introduce electricity into all its workings in the Panther Creek Valley, both for power and lighting. The equipment is now being arranged for and the power will be supplied from the extensive plant at Hauto.

Grafton, W. Va.—A new electric haulage system will be installed in the T. B. Davis mine at Flemington, recently purchased by Clarence D. Robinson, of Fairmont. This mine has had a capacity of 500 tons daily but it is expected that this will be doubled when improvements are completed.

Washington, D. C.—Ten railroads operating in Pittsburgh territory have filed tariffs with the Interstate Commerce Commission proposing increases in freight rates on bitu-

minous coal from Pittsburgh to points in the Middle West. Increases would become effective Jan. 20, if allowed.

Bluefield, W. Va.—A total of 2,698,706 net tons of coal were carried over the Norfolk & Western R.R. during the month of November, this being a decrease of 328,350 tons as compared with the 3,027,236 tons for October of this year, and an increase of 854,949 tons as compared with November of last year.

Camden, Mo.—A charter has been issued by the secretary of state, to the Riverside Coal and Mining Co., of Camden, Ray County, Mo. The capital stock is $2,880, one-half paid. The incorporators are J. S. Finley, William Parr and B. B. King. The company has been organized to mine and market coal.

Columbus, Ohio—It is reported that less than 3,000 coal miners in Ohio are now out of work as against 20,000 a year ago. Between 43,000 and 44,000 are now working and business is rapidly improving. The few thousands of men who are now unemployed are receiving strike benefits.

Kansas City, Mo.—Recent rains at Abilene, Kan., washed out a deep ditch and uncovered a bed of coal on the farm of R. M. White, 25 mi. south of Abilene. The deposit is apparently of good quality and is several feet thick. Specimens have been sent to the state university at Lawrence for analysis.

Moundsville, W. Va.—The Fort Pitt Coal Co.'s mine, situated across the river in Ohio, will be sold to satisfy creditors on Jan. 6. The sale will be in charge of trustee W. E. Thomas, of Bridgeport. One fourth of the purchase price must be paid in cash and the balance as soon as the sale is confirmed.

Wheeling, W. Va.—Following advances in the price of coal both East and West, it was recently announced that the quotations of run of mine coal in the Fairmont-Clarksburg field have been advanced to $1.75 and $2 per ton. Owing to a shortage, the mines are running only about 85 per cent. of their capacity.

Clarksburg, W. Va.—It is stated that not only will the coal interests in the State of West Virginia fight against any increase in the rates on coal to the West, the tariffs of which were recently filed, but that the State Service Commission and the operators would ask that the Interstate Commerce Commission investigate the rates to the East.

Petros, Tenn.—The mine and property of the Big Brushy Coal Co., which was placed in a receiver's hands a short time ago, was advertised to be sold at public sale, by Charles H. Davis, at the Company's commissary at Petros, Morgan County, Tenn., on Dec. 18, 1915, at 12 o'clock noon, subject to a $5,000 mortgage maturing in 1929.

Charleston, W. Va.—A charter was recently issued to the Pilgrim Coal Co., of Uniontown, Penn., for the purpose of operating coal mines in Ohio County, W. Va. The authorized capital of this firm is $5,000 and the incorporators are Harold Robinson, Allen B. Williams, Elizabeth M. Leonard, Donna B. Van Gilder and Abbey L. Culp, all of Uniontown.

Wheeling, W. Va.—There are many rumors afloat regarding the proposed power plant and other improvements at Beech Bottom, but it appears reasonably certain that some big expenditures are projected. It appears to be the intention to use the coal at the mine to generate power that can be transmitted to all the surrounding mines and towns.

Scranton, Penn.—Disturbances in the workings of the surface vein of the National Mine of the Lackawanna company recently caused Beech St. in South Scranton to settle more than 2 ft. Four dwellings were considerably damaged. The affected area is confined to the 700 block, and is adjacent to the other section which suffered considerably during the past few weeks.

Denver, Colo.—The Crown Tar Works of the Denver Gas and Electric Light Co. has closed a contract with the Nitro Powder Co., Kingston, N. Y., for some 25,000 gal. of naphthalene, to be delivered before Jan. 1. It is a novelty for the West to be supplying the East with this sort of material and is a direct result of the European war, which has curtailed the importations from Germany.

Martinsburg, W. Va.—William T. Coale, general manager of the Georges Creek Coal Co., as receiver for the Franklin Coal Co. of Westernport, recently sold for $11,000 the mining outfit of the latter firm, including a number of houses, mine cars, rails, tipples and other property, to the M. J. Miller's Sons of Westernport. The mines will be operated by John J. Miller and J. O. J. Greene.

Philadelphia, Penn.—Vessel freights to coastwise points, especially New England, have almost reached a record point. This has resulted in increasing the demand for coal all-rail from this territory. Recently a rate as high as $3 per ton from Virginia to Maine was paid, which is the highest known for over fifty years. During the anthracite strikes of 13 years ago the rate reached $2.50 per ton.

St. Marys, Ohio—A 3,000-ton coal heap on fire from spontaneous combustion for the past six weeks was cleaned up a few days ago at the generating plant of the Western Ohio Electric Co. A new fire from the same cause has now broken out in a 5,000-ton heap at the same place. The coal in the smaller fire was found mostly "coked," and not much damaged otherwise after the fire.

St. Louis, Mo.—T. T. Stevenson has closed a conditional deal with a New York syndicate for the sale of 22,000 acres of coal land in Meridian, Brookside, Clement and East Fork Townships, Clinton County, Ill., and papers were recently signed. If tests develop satisfactory beds of coal, the owners will receive $15 per acre, or $330,000. The logs of wells drilled for oil in that territory show good beds, and it is claimed that several mines will be sunk.

Clarksburg, W. Va.—Owing to a sudden and unexpected shortage in the natural-gas supply, which caused the West Virginia Public Service Commission to order the Clarksburg Light and Heat Co. to take steps to relieve the situation for the benefit of domestic consumers, the supply of gas has been withdrawn from nearly 100 industrial concerns using it for fuel. This has caused the temporary shut-down, in whole or in part, of many of these concerns, which have heretofore been able to use gas without limit.

Toledo, Ohio—The Toledo Coal Sales Co., has been incorporated for $10,000 and will continue business at 724 Spitzer building as it has been doing for some time past. There will be no change in the management. The general manager of the concern is D. B. Frisbee and the company handles the output of the "Southern Gem" mine in Kentucky and the "Tug Mountain" mine in West Virginia white ash territory. The incorporation was made to make possible the expansion of the business which has been rapidly growing.

Fairmont, W. Va.—A coal famine, due to a shortage of cars, is anticipated. The Philadelphia & Reading R.R. Co. has called in all its cars from the lines of the Baltimore & Ohio and Western Maryland for the purpose of loading them with anthracite coal and stocking for the future. It is said that car shortages have occurred from time to time but there has never been such a shortage as at present and the reason is traceable to prosperity. Every coal operator is clamoring for cars to fill his orders but he is getting only a few.

Central City, Ky.—Extension of the Kentucky Midland R.R. from its terminus in Muhlenberg County to Dawson Springs via Earlington, is reported to be projected. The road was built three years ago from Central City to Summers, a distance of 12 mi. and now handles the output of the big mines at Summers, via Central City. The distance to Dawson Springs, as the road is projected, is 22 mi. and the line would touch rich coal fields between Earlington and Dawson, now undeveloped. The original construction was standard in all respects.

St. Louis, Mo.—The Misosuri Bureau of Labor Statistics reports the states' production of bituminous coal for the year 1914, as 3,935,980 net tons, with a value of $6,802,325, a decrease of 382,145 or 0.85 per cent. under 1913. Macon County led with 765,703 net tons. For the state as a whole, the coal had an average value of $1.73 per net ton. Nine thousand five hundred and forty-nine miners were employed an average of 179 days. Fatal accidents numbered 19. At the present rate of consumption it is figured Missouri coal deposits are ample enough to last 9,000 years.

St. Louis, Mo.—Officials of railroads operating eastward from Chicago and St. Louis report a volume of freight moving toward the Atlantic seaboard, which is taxing their facilities to the limit. This situation has prevailed for the last two or three weeks, and has resulted in embargoes being placed at many of the terminal points and results in an abnormal situation with regard to the movement of east-bound freight. Officials of Southern lines report tonnage as holding steady at the advances established a fortnight ago. Business throughout the South is steadily improving.

Seattle, Wash.—The Port of Seattle is now considering the erection of a colliery for the benefit of boats on the Sound. After waiting five months for the Port Commission to offer terms for a lease of part of their holdings at Smiths Cove, the United Coal Sales Company has leased a site in West Seattle and will at once erect bunkers, and other facilities. The company asked the commission for a lease in July and renewed its efforts in November. It will prepare to take care of vessels which now have to load from barges alongside or go to British Columbia or Tacoma to coal.

Coal Trade Reviews

General Review

Anthracite supplies short with no indications of any relief in sight. Runaway market on bituminous. Further tightening of railroad congestion will create panic conditions. Some consumers hard pressed to keep their plants going. Middle Western roads stocking heavily but the market is not so tight.

Anthracite—Supplies of hard coal at distributing centers are reduced to a point where daily arrivals are going into immediate consumption, and energetic measures are occasionally necessary to keep consumers from running short. All attention at the moment is concentrated on getting tonnage forward with the utmost dispatch. The railroad congestion is more acute, if anything, and the inadequate car supply has seriously interrupted operations in the mining regions, still further restricting the available tonnage. Buyers are aggressively seeking odd tonnages to fill out their requirements, and it is developing that substantial premiums above contract quotations are occasionally being paid on the steam grades. Some of the railroads have already begun to confiscate coal en route.

Bituminous—The spectacular advance of the past week has caught producing interests, distributors and consumers alike unprepared and the market is beyond control. Speculation is rife, brokers turning over tonnage daily at unprecedented profits, and this condition will persist until the carriers solve the transportation riddle. The abundant supplies at Hampton Roads is the only factor restraining the speculative element from forcing prices up to a panic level.

In spite of the fact that all available vessel tonnage has been pressed into service, arrivals are still inadequate so that shippers are holding customers down to the very smallest tonnage they can keep going on and it is probable that some curtailment may result unless the transportation companies succeed in getting coal forward more promptly. It is practically a runaway market, exaggerated predictions concerning prices made a month or six weeks ago having been more than realized. Quotations are fluctuating in a spectacular manner over a wide range.

Exports—The sharp flurry and anxiety regarding supplies in the domestic market have dispelled all interest in the offshore business. While vessel rates have apparently not increased any further, tonnage is more difficult to obtain, and practically everything in the Coastwise market has been covered. Dumpings over the Hampton Roads pier show some improvement, though they are still substantially below the previous high level.

Ohio Valley—Demand on contracts continue very heavy, with the result that there is little free coal to be picked up in the prompt market. The inquiries which developed from the Seaboard last week have apparently not materialized into actual business, though the regular line demand is stronger and prices stiffer. The warmer weather caused a temporary reaction, but none of serious proportions, dealers seizing upon the opportunity to accumulate as large stocks as possible. The steam demand continues particularly strong; there have been plentiful supplies of this grade so far, but it is reported that some consumers have been encountering difficulty in getting sufficient tonnage to keep going. The heavy rains have interfered with transportation in some quarters.

Middle West—The lowest temperatures of the season, supplemented by the constantly expanding demand from industrial quarters and extra orders from the railroads for stocking purposes, has increased the working schedules and strengthened the market still further. Anything on the order of concessions from list prices has been eliminated and the market is firm all along the line. Transportation is fairly good; no serious difficulties have yet been experienced in this direction but it is felt that the general congestion prevailing throughout the East may spread to this section. Weather conditions in the Northwest have not been so favorable to an active consumption, and the movement out from the upper ports has been relatively light.

A Year Ago—Anthracite consumers becoming urgent about prompt deliveries. Bituminous quiet with sellers concerned mostly about new contracts. Effects of the customary year end curtailment already being felt but colder weather stimulates the domestic trade.

BUSINESS OPINIONS

Iron Age—The embargo laid by all railroads on shipments of iron and steel products to New York for export, while it throws some serious problems on the mills, is a blessing to domestic consumers. While exports of steel have been declining since August, largely because of transportation difficulties, they have amounted to enough to bring measurable relief if diverted into home channels. There is more pressure from consumers to get places on the steel companies' order books for deliveries after July 1, 1916, and the amount of such business taken is increasing, though some mills still insist they are not ready to sell for the second half. The calculations of important manufacturers who work up iron and steel are more and more based on the projection of record consumption and high prices far into next year.

Philadelphia News Bureau—With the closing of the year the conditions are very promising. There is naturally much depression over the European outlook, but so far as the domestic situation is concerned there is every reason for confidence. A very encouraging feature is the remarkable Christmas trade, which is not confined to any one section, but is general over the whole country. People have made big money and they are spending it. When the year-end statistics are published much surprise will be expressed at the position of the United States. It is idle to say that we have discounted all the goods that are coming to us.

Dun—Temporary restriction of operations resulted from the storm, which for a time hampered wire and transportation service and aggravated the congestion of freight. Needed deliveries were further retarded and the strength of certain commodities accentuated, while outdoor work in the East and Great Lakes region was partially suspended. Considerable benefit, however, accrued from the snowfall and lower temperatures, additional stimulus being imparted to the distribution of heavyweight apparel, footwear and fuel. Commercial failures this week, are 381, against 372 last week, 361 the preceding week and 449 the corresponding week last year.

Bradstreet—Sustained activity in a majority of lines, with prospects of still greater growth, typify current trade and industrial conditions. Contrary to precedent, the larger trades do not display the customary pre-holiday characteristics that usually prevail when the time for the taking of inventories arrives. True, there has been a lull in some sections, but by and large activity is so steadily maintained that salesmen are remaining on the road longer than usual at this season, and most reports agree that wholesale, as well as jobbing trade is of large volume.

Winter Wheat Condition—The government report on winter-wheat condition, shows a total area sown this fall of 37,256,000 acres, a decrease of 3,197,000, or 8%, from the area harvested this year, with a condition on Dec. 1 of 87.7, as against 88.3 last year, and a ten-year average of 90.8. The condition shown is the lowest since 1911.

Marshall Field & Co.—Current wholesale distribution of dry goods is far in excess of the corresponding period of a year ago. Seasonable weather, together with the record breaking holiday business that retailers all over the country are doing, is largely responsible for this increase. Road sales for both immediate and spring delivery continue to be larger than the corresponding period for the past few years, and the customers have been in the market in greater numbers. Collections are satisfactory and prices firm.

The Southern Lumberman, though winter weather has now come in earnest, the resulting contraction of building operations has so far in no respect weakened the strong yellow-pine market. The actual volume of business moving is somewhat less this week, and has, in fact, shown gradual decrease for the past three weeks, but production at the mills has been kept at its proper level and the market has continued to rise accordingly. Even more uniformly optimistic reports are being received than have characterized the hardwood market during recent weeks.

ATLANTIC SEABOARD

BOSTON

Hampton Roads accumulations likely to be reduced by car and labor shortage. Situation grows more acute from day to day. Georges Creek shipments light and Pennsylvania grades active at new high levels. Water freights nominal with no tonnage to be had. Anthracite shippers getting farther behind.

Bituminous—The situation in New England gets increasingly grave. Hampton Roads is still the one place where there is a surplus of coal and prices have not changed but it is very likely that the holiday period there will show a marked change. Already a scarcity of cars is noted on certain of the Virginia railroads, particularly those with western connections, and if loaded cars are not released at the piers it will mean a reduced output. The Christmas season is another factor that will tend to reduce accumulations at Hampton Roads. Should steamers and barges be obliged to wait for coal it will mean such a falling-off in the only dependable source of supply for this territory that the market will be in very serious straights.

It is reported $7 has been paid for Pocahontas and New River on cars Providence, and apparently there is nothing to prevent a spectacular advance. Shippers are holding their customers down to actual week to week consumption in many cases and most strenuous efforts are being made to keep plants running.

Georges Creek has shortened up materially in supply at all the loading ports, and deliveries at this end are much hampered by slow movement along the coast. Car supply at the mines is rapidly getting worse and shipments to this territory are likely to be few and far between by Jan. 1. That some of the transportation ordinarily carrying Georges Creek has been loading at Hampton Roads this week is a significant development.

The Pennsylvania grades continue active, although the buying of spot lots is rather spasmodic. Cambrias and Somersets meet with ready sale at prices up to $3.25 f.o.b. mines, while good Clearfields are only 25c. less. The higher volatile coals from Clarion, Indiana, and Armstrong counties have already entered the market, although the freight differential against some of them causes a much lower price at the mines. For this grade as high as $2.50, however, has been paid during the week. There is a good deal of tempering of the market and everybody has coal for sale but actual sales so far are not very heavy.

Water Freights—The only reason that rates are not in excess of $3, Hampton Roads to Boston, is that there are practically no bottoms open to charter that can load under 30 days. Several charters have been made for a series of trips at current rates and the prospect is by no means clear. The situation on small boats for New York loading to points like Providence has not eased up in the least; $1.25 has been paid for trips through March and April.

Anthracite—Shipments are extremely slow, and certainly a bad situation is facing Tidewater New England. An embargo against deliveries all-rail to points on the New Haven R.R. only emphasizes the congestion that prevails on most of the lines. Many of the collieries are on half-time. Certain kinds and sizes of hard coal are also in scant supply and most of the dealers are alarmed over the outlook. Dec. 15 the Boston retailers advanced stove and egg coal to $8 and chestnut to $8.25 per net ton delivered.

Bituminous quotations, f.o.b. loading port at points designated, are about as follows per gross ton:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$3.50@4.25	$3.80@4.55	.....	$2.25@3.00
Cambrias and Somersets	3.75@4.50	4.05@4.80	.....	2.50@3.25
Georges Creek	.....	.....	.....	.....

Pocahontas and New River are still quoted $2.80@2.85 f.o.b. Norfolk and Newport News. On cars at Boston prices are $6.50@6.75, and $6.75@7 at Providence.

NEW YORK

Car shortage affecting anthracite market. Some labor troubles on docks. Steam sizes stiffen. Bituminous prices advance. Some manufacturers may run short.

Anthracite—Lack of supply, due to the freight congestion and an increased consumption have caused a tightening of the hard coal situation at Tidewater. In addition to car troubles some shippers are having labor disturbances among the stevedores and coal handlers but this difficulty promises to be settled shortly.

Shippers have had to exert their best efforts to meet orders. The strong situation is reflected in the opening of bids early this week for supplying city departments with 18,000 tons of buckwheat coal and about 250 tons of egg, there being only one bid on each contract; under ordinary conditions there would have been at least a dozen bidders on each item. Boats continue scarce and freight rates remain around the 35c. mark. Prepared coals are commanding full circular and there are reports of premiums for stove and nut sizes. Line demand for the larger sizes is active. High grade steam coals are practically out of the running. Pea coal is quoted at $3.50 and better. Fair grades of buckwheat are commanding from 10 to 20c. above regular price and barley is quoted at $2.25 f.o.b.

Current quotations, gross tons, f.o.b. follow:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$5.05		$5.10	
Egg	5.30	$5.30@5.30	5.35	$5.35@5.35
Stove	5.30	5.30@5.30	5.35	5.35@5.35
Chestnut	5.55	5.55@5.55	5.60	5.55@5.60
Pea	3.50	3.45@3.50	3.55	3.50@3.55
Buckwheat	2.75	2.45@2.75	2.80	2.45@2.80
Rice	2.25	1.95@2.25	2.30	2.00@2.30
Barley	1.75	1.50@1.75	1.80	1.75@1.80

Bituminous—Failure to get shipments forward and a heavier demand have resulted in further price increases at Tidewater though line prices are a trifle softer. However, some shippers believe the situation is easier but see no hope for much improvement unless the freight congestion improves. During the week hardly any grades of coal could be obtained at less than $4 f.o.b. while most quotations were from $4.25 to $4.50 and higher according to quality. There is practically no coal at Tidewater docks owing to the failure of the transportation companies to get shipments forward. Agencies find it impossible to make any promises as to when they can fill orders. Many boats continue to be held at the docks.

Wholesale houses are unwilling to take on any more contracts, on Monday of this week there was but one bidder on a contract for 5,000 gross tons of bituminous slack for one of the city departments. Contractors are becoming anxious and there are reports that some large manufacturers have said that unless they can secure better deliveries it will be necessary to partially suspend operations at their plants. There is very little free coal to be had; quotations range from $4.25 to $4.50, and as there are plenty of buyers, there is little dickering over prices. Slack is quoted at $1.75 at the mines.

Current quotations, gross tons, f.o.b. Tidewater follow:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$4.30@4.55	$4.30@4.55	$4.30@4.35	$2.75@3.00
Georges Creek Tyson	4.05@4.30	4.05@4.30	4.05@4.30	2.50@2.75
Clearfield:				
Medium	4.05@4.15	4.05@4.15	.....	2.50@2.60
Ordinary	3.90@3.95	3.90@3.95	.....	2.35@2.40
Broad Top Mountain	.....	.....	.....	2.25@2.50
Cambria County:				
South Forks	4.05@4.30	.....	.....	2.50@2.75
Nanty Glo	4.05@4.30	.....	.....	2.50@2.75
Barnesboro	4.05@4.20	.....	.....	2.50@2.65
Somerset County:				
Quemahoning	.....	4.05@4.30	4.05@4.30	2.50@2.75
Medium	4.00@4.15	4.00@4.15	4.00@4.15	2.50@2.65
Latrobe	3.95@4.15	.....	.....	2.40@2.60
Greensburg	3.95@4.15	.....	.....	2.40@2.60
Westmoreland	3.75@3.85	.....	.....	2.00@2.10
West Virginia Fairmont ¾		3.80@3.90	3.80@3.90	2.00@2.10
Fairmont mine-run		3.80@3.90	3.80@3.90	2.00@2.16
Steam		3.80@3.95	3.80@3.95	2.25@2.40
Western Maryland		3.80@3.95	3.80@3.95	2.25@2.40

PHILADELPHIA

Anthracite is extremely brisk with chestnut, buckwheat, and rice the leaders. Car supply outlook serious, with many collieries shut down. Bituminous prices touch the $3 mark, and are advancing almost daily.

Anthracite—Sales agencies have abandoned seeking orders, and are now concentrating their efforts on following up shipments, and rushing the coal forward with the utmost dispatch. Orders are plentiful on practically all sizes, and it is impossible to satisfy the demand. With such active conditions at this time, there is a great deal of concern felt over what the situation will be later. The car supply question continues the chief cause for anxiety, the situation in this respect becoming more acute as the season advances. Production is being severely restricted from this cause, one of the leading anthracite companies having been reduced to half-time working schedule during the past week. Sizes that could not be moved, except at the severest kind of a sacrifice a month ago, are now in active demand, some of them bringing substantial premiums.

The purchasing agents for the large consumers are combing the market for coal, and it has developed that a number of large buyers are paying premiums on buckwheat and rice coal. This is particularly the case with bituminous consumers, who are attempting to supplement their requirements

with anthracite coal. A gratifying feature of the situation is the fact that domestic consumers have not yet taken alarm over the situation; the demand from this source continues only on about a normal basis for this season, but even this is sufficient to absorb all the arrivals, and any heavy buying movement would precipitate a runaway market.

The demand for broken shows no abatement. The output could probably be sold at full circular, $3.50 and tax, but the contracts prevent this, as practically all this size is sold that way. Gas companies and iron foundries, which are the principal consumers are endeavoring to stock heavily. Egg is still the weakest size and the companies find it difficult to move at $3.75 and tax, while the individuals show an inclination to shade the price to the extent of 10 or 15c. by omitting the tax. Stove coal is all sold at $4.10 and tax and shippers are unable to supply the demand for this popular size. Chestnut has been the real leader this week; quite a few dealers allowed their stocks of this grade to run down to make room for pea at $2 and tax and they are now suddenly confronted with a great shortage. If the large dealers decide to draw on their storage piles for the prepared sizes, it will relieve the situation provided the inadequate car supply does not interfere.

The rumor of a new price circular at the first of the year grows in strength and it is altogether likely that there will be material changes in all sizes at that time.

The prices per gross ton at mines for line shipment and f.o.b. Port Richmond are as follows:

	Line	Tide		Line	Tide
Broken	$3.50	$4.75	Pea	$2.50	$3.25
Egg	3.75	5.00	Buckwheat	1.50	2.25
Stove	4.00	5.00	Rice	.85	1.75
Chestnut	4.15	5.25	Barley	.50	1.50

Bituminous—Six weeks ago predictions of even $2 coal before Jan. 1 were scoffed, yet that price was reached two weeks ago and we now have $3 coal. Of course this is not on all grades, but numerous sales have been reported at from $2.75 to $3 for coal that a few months ago was considered only ordinary. Price changes have been so rapid that no one cares to venture a prediction. The past week witnessed the biggest advances so far this season, ranging from 70c. down to 25c. or a general average of about 30c. The car supply continues inadequate, with most shippers claiming to receive only 20% to 30% of their requirements.

Prices per gross ton, f.o.b. cars at mines, are about as follows:

Georges Creek Big Vein	$2.75@3.00	Fairmont gas, ¾	$1.90@2.00
South Fork Miller Vein	2.70@2.75	Fairmont gas, mine-run	1.75@1.85
Clearfield (ordinary)	2.50@2.75	Fairmont gas, slack	1.60@1.75
Somerset (ordinary)	2.50@2.75	Fairmont lump, ordinary	1.70@1.80
West Va. Freeport	2.50@2.60	Fairmont mine-run	1.65@1.70
		Fairmont slack	1.60@1.75

BALTIMORE

Trade dominated by many unusual conditions. Low-grade fuels advance rapidly. Hampton Roads coals coming in all-rail.

The trade is dominated by railroad embargoes on general freight, car shortage and excessive vessel freights in such a way that the most unusual conditions have resulted. All consumers, except those suffering from a real pinch, have been practically driven out of the market for the time being. Many lower grade coals have advanced more rapidly than high-price fuels. In such a market it is difficult to quote prices.

An unusual condition was noted here the past week, coals which are usually handled exclusively at Newport News finding their way here by all-rail route for local consumption. This coal was offering at a mine basis of less than $1.50 in many cases in Virginia, and after payment of freights by way of Potomac yards was still delivered here cheaper than some of the steam fuels that are handled through this port regularly. Some effort was made to handle this coal by barge from Newport News, but as rates had jumped to $1.50 a ton compared with the regular barge rate of about 50c. or less, the effort was given up. From $3.50 to $4 is being charged for shipment of coal from this port to Boston, with other New England ports in proportion.

The market is quotable on about the following basis:

	Mines	Balt.*		Mines	Balt.*
Geo. Crk. Big Vein	$3.00	$4.18	Fairmont		
Geo. Crk. Tyson	3.00	4.18	Ordinary mine run	$1.75	$3.23
Clearfield	2.75	3.93	Ordinary ¾	2.00	3.48
South Fork	2.75	3.93	Ordinary slack	1.65	3.13
Latrobe	2.65	3.83	Low sulphur mine-run	Out of market	
Somerset (best)	2.75	3.93	Low sulphur ¾	Out of market	
Somerset (good)	2.55	3.73	Low sulphur slack	Out of market	
Quemahoning	3.00	4.18			
Freeport	2.65	3.83			
Miller Vein	2.75	3.93			

* F. o. b., outside Capes.

HAMPTON ROADS

Some slight increase in demand. Prices unchanged. Government takings fair.

The coastwise and foreign movement has been better the last few days and a fairly large fleet has been loaded. The accumulation at Tidewater has been reduced somewhat although there is still more than the normal supply of coal on hand at this time. Foreign cargoes have nearly all been New River and Pocahontas run-of-mine although some gas coals have been exported. Prices remain unchanged.

The collier "Cyclops" took a large cargo for the government and the Panama R.R. collier "Achilles" took the largest cargo exported during the week. The number of vessels calling here for bunkers was only fair although there was perhaps a slight increase over the previous week's business.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

	Week Ending				
Railroad	Nov. 20	Nov. 27	Dec. 4	Dec. 11	Dec. 18
Norfolk & Western	100,598	118,065	116,450	87,726	104,942
Chesapeake & Ohio	67,209	93,924	81 875	70,535	55,503
Virginian	39,485	54,591	41,386	52,247	61,728
Totals	207,292	266,580	239,711	210,508	222,173

Ocean Charters, Clearances and Freights

OCEAN CHARTERS

The following charters have been reported from various sources during the past week:

PHILADELPHIA

Vessel	To	Tons	Rate
Yuma	Mayport	1,400	
I. B. Wiley	Rio Grand	611	$9.00
Isthmian	Rio de Jaeniro	3,463	

BALTIMORE

Vessel	To	Tons	Rate
Claveresk	Cuba	2,441	
Absalom	Egypt	1,352	

BALTIMORE—Continued

Vessel	To	Tons	Rate
Snowden	Buenos Aires	1,035	

VIRGINIA

Vessel	To	Tons	Rate
Platea	River Plate		
Edith	Porto Rico	1,051	$3.75[1]

[1] And port charges.

VESSEL CLEARANCES

The following steamers have cleared from various ports during the week ended Dec. 17:

NORFOLK

Vessel	Destination	Tons
Achilles[1]	Canal Zone	12,021
Thorsa[2]	Kingston	1,450
Vitalia[3]	St. Thomas	1,500
Sousa[4]	Kingston	1,130
Carmine[2]	Genoa	2,074
Patras[5]	Genoa	4,147
Moldegaard[4]	Puerto	3,954
Tabor[2]	Curacao	5,200
R. W. Clark[6]	St. Georges	668
Assunta[6]	Genoa	1,926

NEWPORT NEWS

Vessel	Destination	Tons
Mt. Vernon[7]	Santiago	950

NEWPORT NEWS—Continued

Vessel	Destination	Tons
Sinaloa[7]	Cienfuegos	2,400
Inverkip[8]	Rio de Janeiro	5,300
Francis[9]	Brazilian	2,415

PHILADELPHIA

Vessel	Destination	Tons
Thelma	Cuba	846
Cressey	Gumacoa	1,500
Merrill	Rio Janeiro	
Yuna	Mayport	
Davenport	San Juan	1,813
S. Palmer	Rio Janeiro	3,900
Bast[1]	Scituate	

[1] W. C. Atwater Co. [2] Castner, Curran and Bullitt. [3] Hasler Bros. [4] Smokeless Fuel Co. [5] New River Coal Co. [6] Pocahontas Fuel Co. [7] Berwind White. [8] C. H. Sprague & Son. [9] C. & O. Coal and Coke Co.

OCEAN FREIGHTS

Steamers are even more difficult to obtain than a week ago, although a number of boats have been chartered. Freight rates are at about the same level. We quote rates on coal by steamer as follows:

To	Rate	To	Rate
Havana	$3.00@3.25	Bermuda	$4.00@ 4.25
Cardenas or Sagua	3.50@4.00	Vera Cruz	5.50@ 6.00
Cienfuegos	3.75@4.00	Tampico	5.50@ 6.00
Port au Spain, Trinidad	4.75@5.00	Rio	12.00@12.60
St. Lucia	4.75@5.00	Santos*	12.00@13.20
St. Thomas	4.25@4.50	Montevideo	12.60@13.20
Barbados	4.75@5.00	Buenos Aires or La Plata†	12.60@13.20
Kingston	4.25	Rosario	12.00@13.20
Curacao	4.50	West Coast of Italy	22.80@24.00
Santiago	4.00@4.25	Barcelona**	21.60
Guantanamo	4.00@4.25	Valparaiso or Callao	12.00@13.00
Demerara	6.50@7.00	Marseilles	21.60@22.80

* Consignees paying dockage dues. ** Spanish dues for account. † Quotations on Plate coal by British steamers; neutral steamers are more difficult to obtain and the rates are always higher.

W. W. Battie & Co.'s Coal Trade Freight Report.

Note—Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge. 24c. per net register ton per day demurrage."

OHIO VALLEY

PITTSBURGH

Less bidding from Seaboard. Better prices locally for prompt, with contract unchanged. Slack strong.

Not so much is heard this week of high prices bid in the East for Pittsburgh coal but the regular line demand is better and higher prices are obtainable in the territory regularly tributary to this district. The highest prices bid by Eastern buyers a week or 10 days ago were $1.75 per gross ton, equal to $1.56 per net ton, for spot shipment with car numbers given and $2, equal to $1.78, for Pittsburgh coal already in the East. Bids now are not much over $1.50.

Car shortages are in evidence at the majority of mines but no serious curtailment has resulted as yet. With heavy demand on contracts, however, the volume of free coal available is far from large, and prompt lots of mine-run are bringing from $1.25 to $1.35. Pittsburgh No. 8 district has experienced no improvement, however, not having had the stiffening effect of a demand from the East, and quotes $1 to $1.05 for mine-run. Slack is in moderate request and is firmly held, with the prospect that any material increase in demand will send prices quickly up to almost the mine-run level.

There are hardly any negotiations on contracts. We quote prices as follows: Prompt: Slack, $1@1.05; mine-run, $1.25@1.35; ¾-in., $1.35@1.45; 1¼-in., $1.45@1.60; on contract to Apr. 1: Slack, $1@1.10; mine-run, $1.25@1.30; ¾-in., $1.35@1.40; 1¼-in., $1.45@1.50, per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous market very feverish. Prices fairly unquotable. Not coal enough to go around. Buffalo far behind seaboard prices, but improving.

Bituminous—Buffalo is substantially behind the prices paid in the Eastern territory, due for the most part to the fact that the trade Westward is not so active and coal from that direction is coming here; at first it was Panhandle coal and now it is that from No. 8 in Ohio that is keeping this market down. It has developed, however, that all these coals are finding it possible to pay an extra rate to Tidewater territory and still make a profit over Buffalo prices; if this proves lasting there will soon be an end of cheap coal here. It is a long time since so many wild stories of the situation have been heard. Jobbing coal at 50c. a ton profit in large amounts is reported and some mine agents declare that they are getting a full dollar a ton more than it costs them. The market has advanced so rapidly that it has caught both sellers and consumers unprepared. Certain Eastern jobbers and consumers are still pretending that they can get coal at a moderate advance and sometimes make offers at prices much lower than salesmen are asking, but there is never any business done on this basis.

Quotations must therefore be accepted as mere efforts to size up the market in this direction, for, as one jobber puts it, the price goes up between one telephone call and the next. Quotations are:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.90	$2.60	$2.75
Three-quarter	2.75	2.40	.....
Mine run	2.65	2.30	2.50
Slack	2.50	2.15	2.50

Quotations are f.o.b. cars at Buffalo or the Niagara bridges and per short ton except east of Rochester or Kingston, Ont.

Anthracite—The demand is only fair. The consumption does not appear likely to equal that of recent years, so that the lost ground, which seemed certain of being recovered during the winter, may not be made up.

The Lake trade closed on Dec. 12, with season's shipments amounting to 3,863,072 short tons, as against 4,285,228 tons in 1914 and 5,033,696 tons in 1913, which was the banner season.

Prices of anthracite are steady at $5.60 for grate, $5.85 for egg and stove, $6.10 for chestnut and $4.30 for pea, per long ton, f.o.b. cars at Buffalo, with 25c. additional for delivering on board vessels.

TORONTO, CAN.

Market fairly active and movement better. Some price advances.

The market for all grades of coal continues fairly active. Dealers are keeping up stocks and supplies are coming forward more freely owing to improved transportation conditions. A noticeable feature of the season's trade is the considerably increased demand for smokeless semi-bituminous coal due to the more rigid enforcement of the smoke laws. There is some scarcity of this grade at present owing to the demand of the Eastern states. It is quoted wholesale per short ton f.o.b. cars at destination at $4 for lump and $3.75 for slack; retail lump, $5.75. Anthracite was advanced this week, quotations for best grades per short ton being as follows: Retail anthracite, egg, stove and nut $8; grate, $7.75; pea, $6.75. Bituminous retail steam $5.25, screenings, $4.25 to $4.50; domestic lump, $6; cannel, $8. Wholesale f.o.b. cars at destination, three-quarter lump, $3.79, screenings $3.15.

COLUMBUS

The colder weather stimulates the domestic trade still farther. Steam trade active and demands for tonnage increasing. Prices remain firm.

The best feature of the coal trade in Ohio has been the increase in orders for domestic tonnage. The lower temperatures are having their effect and dealers are making an effort to accumulate stocks. The demand is well distributed among the various grades and varieties.

Retail trade has been more active than formerly. Dealers are rushed with many small orders, as usual when the first real cold snap appears. Retailers stocks have been sufficient for the extra demands so far but they are not large. Retail prices are ruling firm at the levels which have prevailed for the past 10 days. All recent advances have been maintained.

With the general expansion in manufacturing the demand for steam fuel is increasing constantly and some consumers have trouble in getting a sufficient tonnage. Premiums are being paid for prompt shipment. Iron and steel plants are especially active. There is a scarcity in the supply of the small sizes and prices have been farther advanced.

The recent slump in Pocahontas has been checked by the colder weather. Considerable tonnage from that district is now going Eastward. There is a considerable demand for steam sizes from the Canadian market and a large tonnage is being shipped across the border.

Anthracite is stronger all along the line and there is a scarcity of chestnut size.

Prices in Ohio fields f.o.b. mines, per short tons, are as follows:

	Hocking	Pomeroy	Eastern Ohio	Kanawha
Re-screened lump	$1.60	$1.65	.....	.....
Inch and a quarter	1.50	1.50	$1.35	$1.50
Three-quarter-inch	1.35	1.40	.....	1.35
Nut	1.25	1.30	.....	1.25
Mine-run	1.15	1.20	1.05	1.10
Nut, pea and slack	.90	.95	.80	.80
Coarse slack	.80	.85	.70	.70

CLEVELAND

Market a little weaker. Receipts fairly liberal, but industrial stocks are light. Holiday curtailment will restrict the demand. The retail trade only fair with buying comparatively light.

Pocahontas remains unchanged at the prevailing low prices of the last two weeks. Retail dealers are holding shipments down to their immediate requirements and the market is not so brisk as it was following the first cold snap of the season.

The high prices in other sections have practically restricted Cleveland buyers to No. 8 coal. Youghiogheny is selling at $1.50 at the mines. West Virginia low sulphur fuels are not selling here and the outlook is for very little coal except No. 8 for some time to come. The supply is low though the demand does not seem to show much improvement.

A few cars of No. 8 coal have been shipped to Tidewater; the price at which it was sold is reported to be $1.75 a gross ton at the mines.

Locally the market is up ten to fifteen cents a ton on No. 8.

Jobbers are paying the following prices f.o.b. Cleveland per short ton:

	Pocahontas	Youghiogheny	Bergholz	Wainwright	No. 8
Freight	$1.45	$1.00	$0.70	$0.70	$0.90
Lump	3.25	.....	.....	.....	.....
Lump, 6 in.	.....	.....	2.30	.....	.....
Lump, 1½ in.	.....	2.60	2.10	2.30	2.15
Lump, ¾ in.	.....	2.50	2.00	2.10	2.05@2.10
Lump, 3 in.	.....	.....	.....	2.40	.....
Egg	3.25	.....	.....	.....	.....
Mine run	2.70	2.50	1.90	1.95	2.05@2.10
Slack	.....	2.00	1.90	1.90	1.95

TOLEDO

The colder weather has stiffened up the domestic market somewhat but prices remain practically unchanged. The steam trade is stronger and the prices on slack are firm. None of the large Toledo manufacturing concerns are overstocked and yet there is no dearth of supplies. The car congestion is not so bad as it was but is still a factor to be reckoned with. Practically all the coal on the local docks has been cleaned up and the Lake movement is almost entirely over for the season. Jobbers here are doing a fair business.

DETROIT

Buying of steam coal continues in good volume. Domestic sizes are more popular. Anthracite is sluggish except chestnut. Lake shippers seek tonnage for next season.

Bituminous—Demand for steam coal continues steady. Small sizes are in the best demand and shortest supply. Weather conditions have been more favorable and domestic business is showing a gradually increasing volume. Consignment stock is plentiful, but is causing no serious weakening of prices.

Anthracite—Buying of the larger sizes of anthracite continues in small volume, the market appearing sluggish. Chestnut size is meeting with a ready demand and is occasionally scarce. Some of the shippers have been able to sell chestnut at a premium of 25c. a ton, when they had it. The delivery is sometimes delayed.

Lake Trade—Shippers are making considerable effort to close contracts for vessel capacity to move coal next season. Some business in that line has been done and one shipper is said to have placed a considerable amount under contract not all of which will be moved next season. Vessel owners are confident the carrying rate from Lake Erie to Lake Michigan ports will be advanced at least to 35c., as ore men have bought or placed under charter a large proportion of the independent vessels, with the stipulation in several instances that boats make the upbound trip without cargo to facilitate dispatch.

CINCINNATI

Steam grades strong and prices are stiffer. Heavy rains interfere with movement.

The steam market remains strong. Some nut and slack was selling in Cincinnati during the current week at 90 and 95c., while mine-run in several small quantities brought $1 to $1.10 per ton, and this in face of reports from other Western centers to the effect that mine-run coal is selling for considerably less. Warm weather during the early part of the week brought a temporary lull to the domestic market, but lower temperatures later should bring the domestic market back to the same basis that it has held during the past two or three weeks.

Movement off the Chesapeake and Ohio R.R. may be retarded for 3 or 4 days from Logan County account of heavy slides. This report came from the mines, but has not been confirmed by the railroad.

LOUISVILLE

The market has naturally responded to the stimulus of the colder weather, together with the continued improvement in industrial conditions. It is, however, about a normal market, with prices for block of the eastern Kentucky grades ranging nearer to $2 than heretofore, although the prices at the mines, long-ton basis, are sometimes down to the November level. Nut and slack is stronger and the demand still good, with the supply short.

COKE

CONNELLSVILLE

Prompt furnace coke fluctuating daily. Foundry coke strong. Little interest in contracts. Production increased sharply.

The market for prompt furnace coke has been fluctuating widely. On some days spot furnace coke has sold at $3.50 while the next day the highest bid would be only $3. The total demand has been very limited and the supplies have been correspondingly short. The last sales last week were at $3 and this week no market has been definitely developed, although the usual quotation is $3.50. There are two or three cases of negotiations on contracts for the first three or first six months of next year, and one or two inquiries are out for the second half, from consumers who are already covered for the first half.

Foundry coke continues very strong. At least one maker of high-grade foundry coke has a minimum quotation of $4 for spot foundry, and has been able to effect sales at this figure of single carloads. There are other brands available for less. There does not seem to be much business under negotiation for the first half of the new year. The majority of contracts made last May and June were for the twelve months beginning July 1. The market is quotable approximately as follows: Prompt furnace, $3@3.50; contract, first half, $2.35@2.50; year 1916, $2.25@2.35; prompt foundry, $3.50@4; contract, $3@3.40, per net ton at oven. The H. C. Frick Coke Co. had an option on a large block of coke for delivery over the first half at $2.50 and has allowed it to lapse.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Dec. 11 at 451,896 tons, an increase of 14,645 tons, and shipments at 451,175 tons, a decrease of 6,998 tons.

Buffalo—The market has advanced sharply due to heavy demand and the high price of coal. There are no stocks of account anywhere and the prospect of production exceeding demand is small. As there is no other source of supply here this market has to pay full prices, which rule at $5.25@5.60 for 72-hr. Connellsville foundry, $4.36@4.60 for furnace and $4.10@4.20 for stock, this latter not having advanced as much as other grades.

Chicago—Metallurgical and domestic coke are firm with demand still outstripping the supply. Gas house coke has moved up 25c. per ton. Western byproduct ovens are pushed to the limit of their capacity. Prices per net ton, f.o.b. cars Chicago, are as follows: Byproduct, foundry, $5.25@5.75; byproduct, domestic, $4.75@4.95; Connellsville, $5.25@5.75; Wise County, $5.25@5.50; gas coke, $4@4.25.

St. Louis—The general coke situation is good. A fair volume is moving for domestic use. The industrial consumption is improving with increased operations among the manufactories. Prices per net ton f.o.b. cars St. Louis, are as follows: Byproduct all sizes, $5. Gas house lump and egg, $4.25.

MIDDLE WESTERN

GENERAL REVIEW

Colder weather improves domestic trade. Great activity in steam sizes. Eastern coals fluctuating badly. Anthracite dull.

The weather is without doubt the dominating factor in the domestic markets. The week was ushered in with the lowest temperatures of the season which continued for three days and caused brisk buying by the public. Later in the week the shippers felt the rebound, and domestic orders for re-stocking were much in evidence. Maximum shipments of coarse steam coals continue at high prices, and activity in screenings is unabated. Competitive bidding in several quarters for free tonnage of fine coal has occurred, with the result that some sales have been made very near the mine-run price. Buyers seem more eager to obtain small sizes than coarse steam sizes. The drift of screenings prices is still upward.

The tone of West Virginia smokeless is sluggish, and sales are still being made at indifferent prices. Anthracite buying over the Western country is apathetic, and there is not the snap of other years to the hard-coal market. Adherence to schedule prices generally characterizes Western coals, and as delays in transportation due to snowy weather increase and labor becomes less plentiful, the few concessions that have been made to move surplus domestic sizes are becoming negligible. The car supply at Western mines has been easier, and but little delay has occurred in the movement as a result of the snowy and colder weather.

CHICAGO

Weather favors heavier consumption of domestic sizes. Steam coals still advancing smokeless stronger. Anthracite demand improved.

The Southern Illinois situation has been strengthened during the past week; lump and egg have been moving in much better volume, and screenings are strong at around 85c. Most mines have been running full time this week, and the surplus domestic sizes on track have all been cleaned up. If the present influx of orders for domestic sizes continues, the mines will soon be oversold.

Railroad storage coal is still being shipped heavily from the Springfield district, and screenings are averaging around 75c. Though sales of domestic sizes are not especially large, a marked improvement in the volume of orders from the Chicago district was noticed early in the week.

The demand for all Indiana grades and sizes now exceeds production, and some operators are complaining prices are not as high as they should be; 1¼-in. steam lump is particularly strong, and screenings range from 75c. to 85c. Domestic lump has shown increased vigor by reason of colder weather. Retailers are doing a rushing business, and jobbers are having difficulty in obtaining sufficient tonnage to meet their orders.

The market for domestic sizes of smokeless has improved a little, but it will be another ten days before it is normal. Delayed movement and colder weather had a beneficial effect on lump and egg. Most mine-run has been sold at $1.40. There is evidently too much of a disposition in the smokeless field to cut prices on the slightest pretext, which keeps the buyer uncertain. Pennsylvania smokeless coals are firm, and splint prices are well held.

Hocking prices have been well maintained, 1¼-in. lump realizing from $1.50 to $1.60; 6-in. lump $1.85 to $2, and 3-in. re-screened, $1.75 to $1.85.

Kentucky coals show less varied prices, the higher grades of block selling at about $2 per ton; egg averaging $1.60, and fine coal being strong at around 80c. to 90c.

The movement of anthracite from the mines to this district was interrupted to some extent during the early part of the week, but there was enough coal on hand to meet the spurt of orders due to colder weather. Apparently some of the outlying country dealers have not stored much anthracite, and the cold weather caught them short of stocks. Prices have held close to circular.

Quotations in the Chicago market are as follows: Per net ton f.o.b. cars mines:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	$1.60@1.75	$1.50@1.75	$1.60@1.70	$1.50@1.60	$1.45@1.60
Steam lump	1.30@1.40	1.30@1.35	1.30@1.40	1.25@1.35	1.35@1.45
2½ and 3-in. lump	....	....	1.40@1.50	1.35@1.45	1.35@1.45
1¼-in. lump.			1.25@1.35	1.15@1.25	
Egg	1.60@1.75	1.60@1.65	1.15@1.20	1.10@1.20	1.15@1.30
Nut	1.60@1.75	1.60@1.65	.95@1.10	1.00@1.15	1.00@1.10
No.1washed	1.60@1.75	....	1.50	....	....
No.2washed	1.40@1.50	....	1.40	....	....
No. 1 nut	1.60@1.75	....	....	....	....
No. 2 nut	1.40@1.50	....	....	....	....
Mine-run	1.10@1.15	1.05@1.10	.85@1.00	.95@1.00	1.05@1.10
Screenings	.85@ .90	.75@ .80	.75@ .85	.75@ .80	.80@ .95

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.65@1.75	$1.50@2.40	$1.80@2.00	$1.95@2.00	$1.85@2.00
1¼-in. lump.	1.30@1.40	1.35@1.50	....	....	1.50@1.60
Egg	1.60@1.75	1.40@2.00	1.60@2.00	1.95@2.00	1.75@1.85
Nut	....	1.25@1.75	1.50@1.75	1.40@1.60	1.30
No. 1 nut	1.60@1.75	....	....	....	....
No. 2 nut	1.40@1.50	....	....	....	....
Mine-run	1.15	1.10@1.15	1.25@1.40	1.25@1.40	1.10@1.20
Screenings	.80@ .85	.80@ .90	....	....	.75@1.00

ST. LOUIS

Colder weather and improved steam consumption create a better tone in the market. Car supply short.

Increased activity was quite noticeable the past week. Domestic coal moved in better volume, due to slightly colder weather. With constant improvement in the general industrial situation comes a proportionate increase in the factory consumption and there has been some improvement due to the call for storage coal; some of the railroads in this section have commenced to store as well as a few of the industrials. Screenings have held steady without sign of retarding. The car supply is short, more so than it realized, but it is not as yet seriously felt, because mining operations are still somewhat restricted, except in a few instances.

Quotations f.o.b. mines during the past week have ranged on the following basis per short ton:

	Williamson and Franklin	Staunton and Mt. Olive	Montgomery Co.	Intermediate	Standard
8 in. lump				$1.25	$1.10 @ 1.15
6 in. lump	$1.50	$1.25	$1.25	1.25	1.10 @ 1.15
3 in. lump	1.40	1.15		1.25	
2 in. lump	1.35	1.15		1.20	.90 @ 1.00
1¼ in. lump	1.30		1.10	1.10	.90 @ .95
6x3 in. egg	1.40			1.25	1.00 @ 1.10
6x2 in. egg			1.10	1.10	.85 @ .90
6x1¼ in. egg	1.30				
No. 1 nut	1.20			1.10	.90 @ 1.00
No. 2 nut	1.10	.75		.90	.75 @ .80
Mine run	1.10	1.00	1.05	1.05	.85 @ .90
Screenings	.75	.65	.65	.65	.60 @ .65
No. 1 washed nut	1.50	1.40		1.40	1.40
No 2 washed nut	1.35	1.25		1.25	1.25
No. 3 washed nut	1.25	1.15		1.15	1.15
No. 4 washed pea	1.25	1.00		1.00	1.00
No. 5 washed slack	.75	.65		.65	.65

DULUTH

Market quiet. Weather continues mild. Navigation closes for the year.

Mild weather for the past three weeks, has caused a rather slow movement of coal. Salesmen report business quiet due to weather conditions and in nearly every instance the country dealers and retailers have supplies to last for the time being or until the arrival of a cold snap. The railroads moved a fair tonnage during the week to interior points.

Navigation has closed and no further coal cargoes are due to arrive this year. Although no tonnage figures have as yet been made public, it is expected that the bituminous arrivals will show a decrease over those of last year, while anthracite will make a slight gain. No change in prices has as yet been announced. Quotations are as follows, per short ton, f.o.b. cars at docks, Duluth.

	Yough	Splint	Hock	Smokeless	Elkhorn
Lump	$3.40	$3.40	$3.40	$4.75	$3.75
Dock run	3.10	3.10	3.10	3.25	3.25
Egg, stove and nut	3.40	3.40	3.40	4.75	3.65
Screenings	2.40	2.40	2.25	2.75	2.55

The movement of anthracite during the past week has been very slow, small orders of the minimum car variety prevailing and the disposition of the dealers was to purchase no more than was absolutely necessary. Prices are as follows: Nut, $7.10, egg and stove, $6.85; pea, $5.55 and buckwheat, $4, all per short ton f.o.b. cars at the Duluth docks.

INDIANAPOLIS

Moderate car shortage. Good demand all along the line. Retail prices advanced.

Indiana mines are again feeling the pinch of the short supply of cars. No complaint is heard as yet as the shortage is not seriously handicapping the operators. It is the opinion of the trade that the car congestion in the East is sure to be reflected here, sooner or later, and when the cold weather comes, car trouble may be anticipated.

There is good demand for all grades though domestic grades are easy, due to a lack of wintry weather. In the open market 80 and 85c. can be obtained for screenings, f.o.b. mine; for domestic lump $1.65 for best Nos. 4 and 6 and $1.50 for 2½ in. Retailers have advanced prices of forked Kanawha lump and Ohio Hocking lump 25c. a ton and have made the same raise on prices of Ohio Hocking washed egg, Kentucky lump and chestnut, stove, egg and grate anthracite. The new schedule of prices, in force Dec. 15 is:

Linton No. 4 lump forked	$3.25	Pocahontas forked lump	$6.00
Indiana lump forked	3.00	Pocahontas shoveled lump	5.50
Indiana lump and egg, screened	2.75	Pocahontas mine run	4.50
Kanawha lump, forked	4.50	Pocahontas, nut and slack	3.75
Ohio Hocking, lump	4.50	Anthracite, chestnut	8.50
Ohio Hocking, wash egg	4.75	Anthracite, stove and egg	8.25
Kentucky lump	4.75	Anthracite, grate	8.00
Ohio Jackson lump, forked	5.25	Connellsville coke	6.00
Blossburg smithing	5.50	Indianapolis by-product coke	6.00
Cannel lump	6.00		

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN

Distribution of shipments for October and November follows:

	October			November		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas	1,620,736	12,436	1,633,172	1,387,567	12,137	1,399,704
Tug River	375,743	2,788	378,531	339,154	3,474	342,628
Thacker	264,619	7,338	271,957	267,961	7,271	275,232
Kenova	95,438	10,590	106,028	92,587	10,833	103,420
Totals	2,356,536	33,152	2,389,688	2,087,269	33,715	2,120,984

Shipments of coke entirely from the Pocahontas field amounted to 65,836 tons in October and 74,293 in November.

GREAT BRITAIN

Exports—British exports for October and the first ten months of the past three years were as follows:

	October			Ten Months		
To	1913	1914	1915	1913	1914	1915
Russia	756,112	19,107	2,890	5,218,772	3,086,032	41,558
Sweden	503,863	525,357	183,147	3,779,014	3,580,692	2,274,194
Norway	200,079	197,813	195,514	1,888,628	2,104,903	2,292,189
Denmark	281,369	313,873	218,143	2,494,585	2,581,185	2,741,093
Germany	835,839	.....	.....	7,619,413	5,256,765	.....
Netherlands	167,299	108,851	171,094	1,712,193	1,565,953	1,500,333
Belgium	181,591	82,148	.....	1,728,225	1,166,549	.....
France	1,077,519	1,066,066	1,602,306	10,644,929	10,046,810	14,827,062
Portugal[1]	94,748	65,434	84,069	1,124,872	988,620	871,491
Spain[4]	328,971	200,708	167,923	3,074,153	2,659,286	1,719,553
Italy	910,513	705,346	559,534	8,060,538	7,262,616	4,962,532
Aus. Hung.	103,433	.....	.....	899,840	564,362	.....
Greece	84,033	20,632	16,864	591,284	510,380	296,918
Roumania	47,864	.....	.....	197,381	218,218	.....
Turkey	61,728	12,069	.....	246,682	429,506	10,324
Algeria	108,422	31,896	66,889	1,060,663	812,523	793,215
Portugal[6]	10,908	4,166	6,114	200,990	157,452	156,536
Chile	35,310	10,382	385	492,951	370,773	39,040
Brazil	147,943	71,596	22,274	1,593,692	1,038,214	446,556
Uruguay	33,612	46,143	13,173	601,754	526,665	270,531
Argentine	297,148	173,068	36,553	3,022,451	2,535,790	1,325,993
Channel Is.	14,726	12,317	8,924	136,559	139,540	109,384
Gibraltar	25,311	15,116	26,744	280,102	254,322	296,528
Malta	42,068	13,193	12,806	548,429	324,234	127,300
Egypt[2]	229,100	167,770	74,353	2,488,330	2,361,658	1,154,788
Aden[3]	20,881	16,967	1,476	148,559	135,817	112,365
India	14,216	12,523	715	140,048	139,784	23,800
Ceylon	23,764	16,834	.....	198,122	239,871	38,730
Miscell'ous.	101,103	95,122	53,656	1,004,102	1,002,326	512,745
Coke	150,955	150,879	113,499	989,010	975,204	798,188
Briquettes	169,500	56,005	127,024	1,711,865	1,487,943	1,087,660
Total	7,059,928	4,151,381	3,771,069	63,958,136	54,523,993	38,830,606
Bunker	1,888,794	1,455,447	1,022,578	17,434,411	16,037,409	11,745,472

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies. [4] And Canaries. [6] West Africa.

Note—The figures in the above table do not include Admiralty and certain other shipments.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

✚Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city tonnage and page on which the detail notice appeared.

No.	Purchaser	City	State	Tonnage	Page
1603	Springfield Lake San.,	Krumroy Sta.,	Ohio,	15,000	737
1654	Chester Tube Co.,	Chester,	Penn.		911
1655	Chester Brewing Co.,	Chester,	Penn.	600	911
1656	Caledonia Mills,	Clifton Hgts.,	Penn.		911
1659	Tilden-Morris Co.,	Eddystone,	Penn.		911
1661	Scheidt Brewing Co.,	Norristown,	Penn.		911
1662	Wapakoneta Elec. & Water Wks.,	Wapakoneta,	Ohio	4,000b	911
1664	Hotel Dennis,	Atlantic City,	N. J.	4,000a	911
1678	Hahnemann Hospital	Philadelphia,	Penn.	3,000a	912
1680	G. P. Pilling & Sons,	Philadelphia,	Penn.	2,500a	912
1681	Spreckles Sugar Refining Co.,	Philadelphia,	Penn.	20,000a	912
1685	Union Cap. Life Ins. Co.	Cincinnati,	Ohio	5,000a	957
1685	Union Cap. Life Ins. Co.,	Cincinnati,	Ohio	200b	957[1]
1686	Alton Steel Hoop Co.,	Alton,	Ill.	250	957[2]
1687	Local Elec. Lt. Plant,	Millvalle,	Penn.	30,600b	957
1692	Advance Compressor Co.,	Battle, Creek,	Mich.	400b	957[3]
1693	Indus. Stor. & Warehouse Co.,	Philadelphia,	Penn.	6,000b	957[2]
1694	T. Devlin Mfg. Co.,	Philadelphia,	Penn.	4,300a	957
1694	T. Devlin Mfg. Co.,	Philadelphia,	Penn.	5,500b	957
1694	T. Devlin Mfg. Co.,	Philadelphia,	Penn.	900c	957
1698	Dept. Public Works	Milwaukee,	Wis.	2,000b	958
1704	Counties Gas & Elec. Co.,	Norristown,	Penn.	5,000	958
1705	Dourte-Hessell Mfg. C.,	Colo. Springs,	Colo.	500b	958
1712	W. Green Blower Co.,	Pottstown,	Penn.	600	998
1713	McClintic-Marshall Construction Co.,	Pottstown,	Penn.	1,200	998
1715	Water and Light Dept.,	Austin,	Tex.	60b	998[1]
1716	Reading Hardware Co.,	Reading,	Penn.	5,000	998
1718	Robesonia Iron Co.,	Robesonia,	Penn.	35,000	998
1719	Taubell, Inc.,	Riverside,	Penn.	8,000	998
1720	Gaynor Glass Works	Salem,	N. J.	4,000	998[3]
1722	Quenelda Graphite Co.,	Quenelda,	Ala.	1,560 130	998
1723	Lt. & Power Dept.,	Russellville,	Ky.	2,880b	998[3]
1724	Elec. Short Line Ry.,	Minneapolis,	Minn.	2,200	998
1725	Wolf Co.,	Chambersburg,	Penn.	2,250b	998[2]
1729	Abernathy Furniture Co.,	Kansas City,	Mo.		999[2]
1733	Peerless Cement Co.,	Union City,	Mich.	45,000	999[1]
1734	De Queen Ice & Light Co.,	De Queen	Ark.	2,000b	999
1735	Borough Lt. Plant	Tarentum,	Penn.	3,000b	999
1736	Lt. & Water Plant,	So. Whitley,	Ind.		999
1766	Link-Belt Co.,	Philadelphia,	Penn.	1,500a	1044
1767	Southwark Mfg. Co.	Camden,	N. J.	2,500a	1044
1769	Baldt Steel Co.,	New Castle,	Del.		1044
1770	Struse & Sons,	Philadelphia,	Penn.	2,000	1044
1773	Ames Shovel & Tool Co.,	Cheltenham,	Penn.	1,500a	1044
1774	Amer. Laundry Co.,	NewOrleans,	La.,	25,000	1044
1777	Western Penitentiary Penn.,	Pittsburgh,	Penn.		1044

a Indicates anthracite coal. b Indicates bituminous. c Indicates coke.
[1] Per day. [2] Per week. [3] Per month.

Notes and Awards

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

1029—Kansas City, Mo.—This contract (p. 115), which provides for furnishing the local branch of the Cudahy Packing Co. with its winter's fuel supply, involving approximately 200 tons per day, has been awarded to the **Cherokee Fuel Co.** The contract will expire in June. Address Purchasing Agent, Cudahy Packing Co., Kansas City, Mo.

1179—Kansas City, Mo.—Experiments are being conducted on this contract (p. 244), which provides for furnishing the Kansas City Terminal Ry. Co. with approximately 250 tons of coal per day, and the contract will probably be concluded early next month. Address Pur. Agt. A. J. Stewart, Kansas City Terminal Co., Union Station, Kansas City, Mo.

1515—Saratoga Springs, N. Y.—This contract (pp. 577, 660), was awarded to the **Saratoga Coal Co.**, at $6.90 for egg, and $6.37 for grate. The contract provides for 100 tons for immediate delivery, and 100 tons to be delivered later. Address Comr. Michael J. Mulqueen. Saratoga Springs, N. Y.

✚**1525—New Hampton, Iowa**—This contract (p. 616), which provides for furnishing the County Government with approximately 200 tons of coal has been awarded to the **Merchants Coal and Coke Co.** of Chicago, at $4 per ton for Brazil block coal. There were two other bids on the business. Address Audr. P. E. McGinn, New Hampton, Iowa.

✚**1537—Le Mars, Iowa**—This contract (p. 617), which provides for furnishing the Haynes County Court House, Jail and County Poor with coal during the ensuing year, has been awarded to the **M. A. Moore Co.** on Lincoln Springfield lump at $4.68 per ton in car lots, and $5.18 delivered. Address County Audr. J. M. Hayes, Le Mars, Iowa.

1653—East St. Louis, Ill.—Purchases on this contract (p. 911), which provides for furnishing the requirements of the Granby Smelting and Mining Co., will be confined to the open market for at least another month. Address Supt. Ross Boles, Granby Smelting and Mining Co., East St. Louis, Ill.

✚**1674—Erie, Penn.**—Proposals on this contract (p. 912), which provides for furnishing the fuel requirements of the City Government, will not be received until January, at which time they will be acted upon by a new council. Address Supt. Frank E. Pelow, Dept. of Parks and Public Property, Erie, Penn.

1677—Chicago, Ill.—Bids have been received on the contract for furnishing the City Government with coal (pp. 912, 1043), as follows, the prices given being those computed by the city government as the actual cost in heat units according to analysis submitted per ton:

Pumping Stations: Bickett Coal and Coke Co., Chicago Ave., $2.46; 14th St., $2.43; Harrison St., $2.02; 68th St., $1.62. E. Puttkammer Coal Co., Springfield Ave., $2.05; 22d St., $2.12 and $1.72; Central Park, $1.96 (11,000 tons of mine-run also the same on 35,200 tons of nut). Ender Coal and Coke Co., Roseland, $1.60; Central Park, $1.95 on 11,000 tons of mine-run and $2 on 35,200 tons of nut. J. J. Conners, Rogers Park, $2.71; Lake View, $2.49.

Bureau of Engineering: Consumers Coal Co., $3.97 on 1,400 tons of lump "A" and $5.345 on 5,675 tons of lump "B." Pilsen Coal Co., $3.705 on 1,400 tons of lump "A" and $5.246 on 5,675 tons of lump "B"; in District No. 4, Consumers Coal Co. $5.375 on 3,500 tons of lump "B"; Pilsen Coal Co. $4.308 on 3,500 tons of lump "B."

Fire Department: Consumers Coal Co., $6.97 on 899 tons of range or chestnut; $3.50 on 883 tons of bituminous lump; $3.50 and $3.378 on 1,617 tons of lump; $7.35 and $6.85 on 916 tons of anthracite egg; $7.47 and $6.97 on 944 tons of range or chestnut; $4 and $3.50 on 2,165 tons of bituminous lump; $4 on 1,419 tons of lump. Pilsen Coal Co., $3.345 and $2.50 on 1,617 tons of bituminous lump. Bickett Coal and Coke Co., $2.52 and $2.17 on 6,640 tons of mine-run; $2.62 on 9,000 tons of bituminous nut.

Department of Police: Consumers Coal Co., $4.075 on 850 tons of mine-run; $3.956 on 1,145 tons of mine-run.

Department of Health: Consumers Coal Co., $4.076 on 925 tons of mine-run; $1.75 on 600 tons of screenings. Pilsen Coal Co., $3.85 on 3,070 tons of mine-run; $1.655 on 26,000 tons of screenings; $1.75 on 900 tons of bituminous screenings. Ender Coal Co., $4.10 on 3,070 tons of mine-run; $1.57 on 26,000 tons of screenings.

As a rule only bids on contracts involving 1,000 tons or more are given in the above, although in a few instances tonnages somewhat less are noted. Address City Engr. John Ericson, Bureau of Engineering, Department of Public Works, Chicago, Ill. (No. 312, Vol. 7, pp. 488, 666, 748, 915.)

✚**1746—New York, N. Y.**—Only one bid has been received on this contract (p. 999), which provides for furnishing the Department of Docks and Ferries with approximately 22,000 gross tons of anthracite and bituminous coal. This bid, which was submitted by Pattison & Bowns, was: Buckwheat No. 1, $4.97; bituminous slack, $4.97; buckwheat No. 3, $4.69. Address Comr. of Docks R. A. C. Smith, Pier "A," Battery Place, New York (No. 1583, Col. 8, pp. 700, 828.)

1747—New York, N. Y.—Only one bid was received on this contract (p. 1043), which provides for furnishing approximately 3,500,000 lb. of anthracite coal for the Asphalt Plant, this bid being submitted by Charles E. Norton & Co. at $1.41½ per thousand pounds for buckwheat and $2.90 for egg. Address Borough Pres. Marcus M. Marks, Municipal Bldg., New York, N. Y. (No. 605, Vol. 7, pp. 795, 918.)

1764—New York, N. Y.—No bids were received on this contract (p. 1044), which provides for furnishing approximately 700 tons of anthracite coal for various public buildings in the Borough of Richmond, S. I. It is understood that the business will be readvertised again. Address Pres. Calvin D. Van Name, Room 18, Borough Hall, New Brighton, Staten Island.

New Business

Volume and page number in parenthesis at the end of an item indicate where the previous announcement, bids and awards on that contract may be found.

1783—Atlantic City, N. J.—The Somers Brick Co. at this place usually send out inquiries for its annual coal contracts about Feb. 1, and concludes the business on Mar. 1. They require about 800 tons. The plant is located at Bakersville, N. J. Address Purchasing Agent, Somers Brick Co., Atlantic City, N. J.

1784—Bridgeport, Conn.—The Diamond State Fibre Co. usually send out inquiries on its annual fuel contract about Feb. 1, and conclude the business on Apr. 1. They require approximately 30,000 tons, and deliveries are made by Philadelphia & Reading and Pennsylvania railroads. Address Pur. Agt. Yates, The Diamond State Fibre Co., Bridgeport, Conn.

1785—Bridgeport, Conn.—The A. H. March Packing Co. usually send out inquiries for its annual fuel requirements about Feb. 1, and conclude the contract on Apr. 1. Deliveries are made by Philadelphia & Reading Ry. Address Pur. Agt. March, The A. H. March Packing Co., Bridgeport, Conn.

1786—Chester, Penn.—A. P. Musselman usually sends out inquiries for his annual fuel requirements, involving approximately 600 tons on Feb. 1, and the business is concluded on Apr. 1. Address A. P. Musselman, Chester, Penn.

1787—Chicago, Ill.—The requirements of the Hirsh, Stein & Co., involving about one car per day of Illinois and Indiana lump coal, will be purchased in the open market. Address Pur. Agt. J. Tecka, Hirsh, Stein & Co., 2841 S. Ashland Ave., Chicago, Ill.

1788—Philadelphia, Penn.—The S. J. Creswell Iron Works is in the market for its annual fuel supply, involving approximately 2,000 tons of steamboat and rice coal. The contract becomes effective Jan. 1. Address Secretary, The S. J. Creswell Iron Works, 23rd and Race St., Philadelphia, Penn.

1789—Coatesville, Penn.—Worth Brothers at this place usually send out inquiries on their annual contract, involving approximately 13,500 tons about Feb. 1, and conclude the business on Apr. 1. Deliveries are made by Philadelphia & Reading and Pennsylvania railroads. Address Pur. Agt. Cairnes, Worth Brothers Co., Coatesville, Penn.

1790—Coatesville, Penn.—J. Shallcross & Son usually send out inquiries on their annual fuel requirements about Feb. 1, and conclude the business on Apr. 1. Deliveries are made by Pennsylvania R.R. Address Purchasing Agent, J. Shallcross & Son, Coatesville, Penn.

1791—Conshohocken, Penn.—J. Wood Brothers & Co. at this place usually send out inquiries for its annual fuel requirements, involving approximately 40,000 tons, about Feb. 1, and conclude the contract about Apr. 1. Deliveries are made by the Philadelphia & Reading and Pennsylvania railroads. Address Pur. Agt. Wood, J. Wood Bros. & Co., Conshohocken, Penn.

1792—Chicago, Ill.—The contract of C. F. Claussen & Co., at this place will be negotiated about Feb. 1. Approximately 28 cars of washed nut coal will be required. Address Pur. Agt. H. D. Claussen, C. F. Claussen & Co., 5147 S. Western Ave., Chicago, Ill.

1793—Camden, N. J.—The Southwark Steel Co. at this place usually send out inquiries for its annual fuel contracts, involving approximately 35,000 tons of bituminous and coke about Feb. 15, and conclude the business on Mar. 1. Address Pur. Agt. Hanson, Southwark Steel Co., Camden, N. J.

1794—Camden, N. J.—The West Jersey Paper Manufacturing Co. usually send out inquiries for its annual fuel contracts involving approximately 5,000 tons on Feb. 1 and conclude the business on Apr. 1 Deliveries are made by water. Address Pur. Agt. Stafford, West Jersey Paper Manufacturing Co., Camden, N. J.

1795—Harrisburg, Penn.—The Harrisburg Pipe and Pipe Bending Co. at this place usually send out inquiries for its annual fuel requirements about Feb. 1 and conclude the business about Apr. 1. The company requires about 50,000 tons of gas coal and 250,000 tons of low volatile bituminous. Deliveries are made by the Pennsylvania R.R. Address Pur. Agt. W. P. Hildrup, Jr., Harrisburg Pipe and Pipe Bending Co., Harrisburg, Penn.

1796—Mays Landing, N. J.—The Atlantic Brick Manufacturing Co. at this place usually send out inquiries for its annual contract involving approximately 5,000 tons on Feb. 1 and conclude the business on Apr. 1. Address Pur. Agt. T. LaRue, Bartlett Building, Atlantic City, N. J.

1797—New York City, N. Y.—The Warren Manufacturing Co. at this place usually send out inquiries for its annual fuel contracts about Feb. 15, and conclude the business on Apr. 1. The company uses Lehigh rice and buckwheat coal. Address Pur. Agt. R. G. Spencer, Warren Manufacturing Co., 41 Park Row, New York City.

1798—New York, N. Y.—The Cuneo Importing Co. usually send out inquiries for its annual fuel requirements about Feb. 15, and conclude the business on Apr. 1. The company has boats at both New York and Philadelphia, and require about 20,000 tons at the former and 100,00 tons at the latter place. The New York point of delivery is at Pier 10, North River. Address Pur. Agt. Spado, Cuneo Importing Co., Pier 10, North River, New York City.

1799—Plymouth, Penn.—The American Magnesia Covering Co., usually send out inquiries for its annual fuel contracts about Feb. 15, and concludes the business about Apr. 1. Address Pur. Agt. Crabbs, American Magnesia Covering Co., Plymouth, Penn.

1800—Philadelphia, Penn.—The Girard Iron Works at this place is in the market for its annual fuel supply, involving approximately 800 tons of anthracite rice coal. Address Purchasing Agent Girard Iron Works, 22nd and Allegheny Ave., Philadelphia, Penn.

1801—Upland, Penn.—The Chessaqua Silk Co. usually send out inquiries on their annual fuel contract, involving approximately 2,000 tons on Feb. 1 and the contract is concluded about Mar. 1. The company requires about 2,000 tons, and deliveries are by Philadelphia & Reading Ry. Address Pur. Agt. Thomas, Chessaqua Silk Co., Upland, Penn.

1802—Westchester, Penn.—The Westchester I. & C. S. Co. usually send out inquiries for its annual coal contract involving approximately 2,500 tons about Feb. 1, and the business is concluded in Apr. 1. Deliveries are by Philadelphia & Reading Ry. Address Purchasing Agent, Westchester I. & C. Co., Westchester, Penn.

1803—Westchester, Penn.—The Westchester Gas Co. usually sends out inquiries for its annual fuel contract involving approximately 600 tons about Feb. 1, the business being concluded on Apr. 1. Deliveries are by Philadelphia & Reading Ry. Address Pur. Agt. Samson, Westchester Gas Co., Westchester, Penn.

1804—Allentown, Penn.—The American Steel and Wire Co. at this place usually send out inquiries for its annual coal contract about Feb. 1, the business being concluded on Apr. 1. They require about 24,000 tons of buckwheat No. 2 and 12,000 tons of gas slack. Deliveries are made by Lehigh Valley R.R. Address Pur. Agt. E. E. Stone, American Steel and Wire Co., Cleveland, Ohio.

1805—Allentown, Penn.—The National Silk Die Works at this place usually send out inquiries for its contracts involving approximately 100,000 tons of coal, about Feb. 1. Deliveries are made by Lehigh Valley and Central Railroad of New Jersey. Address Pur. Agt. Lotte, National Die Works, Allentown, Penn.

1806—Allentown, Penn.—The Allentown Flint Bottle Works usually send out inquiries for its annual contract about Feb. 1, and the business is concluded about Apr. 1. The contract involves approximately 50,000 tons of low sulphur gas coal, and deliveries are made by Lehigh Valley Ry. Address Purchasing Agent, Allentown Flint Bottle Works, Allentown, Penn.

1807—Ambler, Penn.—The Keasbey & Mattison Co. at this place usually send out inquiries on its annual coal contract about Feb. 1, and conclude the business in Apr. 1. Deliveries are made by Philadelphia & Reading Ry. Address Purchasing Agent, Keasbey & Mattison Co., Ambler, Penn.

✚1808—Easton, Penn.—The City Government is receiving bids for furnishing the electric-light station with approximately 1,500 gross tons of buckwheat, 90 tons of stove for the central fire station and four other engine houses, and 70 tons of stove for the municipal building. Bids must be submitted on blank forms, which may be obtained on application, and must be accompanied by certified check for $100. Address City Clerk, Easton, Penn.

1809—Jackson, Mich.—The Peninsular Portland Cement Co. will negotiate its annual contract, involving approximately 40,000 tons of coarse slack coal, some time in February. Deliveries are made by railroad, in equal monthly proportions. Address Pur. Agt. G. V. Cody, Peninsular Portland Cement Co., Jackson, Mich.

1810—Cumberland, Md.—Bids will be received until 9 a.m., Dec. 27, for furnishing the local electric-light plant with mine-run coal as may be required during the ensuing year. Bids should be on a long-ton basis and both in car lots, f.o.b. Smith's siding, and delivered in boiler room. Address Comr. J. S. Schriver, Water and Light Dept., Cumberland, Md.

1811—St. Louis, Mo.—The Jack Daniels Distilling Co. will begin testing out various grades of 2-in. lump coal preparatory to negotiating its annual fuel requirements, involving about 130 tons per month, on Jan. 1. Address Pur. Agt. Harry Newsham, Jack Daniels Distilling Co., St. Louis, Mo.

1812—Buffalo, N. Y.—The Morlook Collieries Co. at this place is in the market for a tonnage of Pocahontas and New River Smokeless coal for prompt shipment. Address the Morlook Collieries Co., 876 Ellicott Sq., Buffalo, N. Y.

✚1813—Greenfield, Ind.—Bids are being received for furnishing the County Heating Plant and Poor Farm, with approximately 800 tons of mine-run, 1¼-in. lump and egg coal. This contract is usually let through a local dealer. Address Purchasing Agent, County Poor Farm, Greenfield, Ind.

1814—Homestead, Penn.—Bids will be received until Jan. 1 for furnishing the local Water-Works with slack coal as may be required during the ensuing year. Bids should be made f.o.b. cars at the water-works siding. Address Borough Clk. Frank Trautman, Homestead Water-Works, Homestead, Penn.

✚1815—Moose Jaw, Saskatchewan, Can.—Bids will be received until noon, Dec. 30, for furnishing the City Power Plant with its annual fuel supply, involving approximately 12,000 tons of coal. Address Comr. Jas. Pascoe, City Comr., Moose Jaw, Saskatchewan, Can.

1816—St. Louis, Mo.—The Mine La Motte Co. is in the market for its annual fuel supply, involving approximately 1,500 tons of 1½-in. screenings and 1,200 tons of mine-run per month, deliveries to be made by Iron Mt. R.R. to Mine La Motte, Mo. Address Gen. Mgr. A. J. Meier, Mine La Motte Co., St. Louis, Mo.

1817—Toledo, Ohio—The Big Four Coal Co. is in the market for two cars of ¾-in. lump or egg coal per month, deliveries to continue until Apr. 1. Address General Manager The Big Four Coal Co., Toledo, Ohio.

1818—Chicago, Ill.—The Midland Linseed Products Co. will purchase its annual fuel requirements, involving approximately 5,000 tons Indiana screenings, in the open market. Address Pur. Agt. P. A. Brett, Midland Linseed Products Co., 927 Blackhawk St., Chicago, Ill.

1819—Chicago, Ill.—Byrne Brothers Dredging and Engineering Co. will contract for its annual fuel requirements, involving approximately 5,000 tons, some time during the early part of the year. Illinois lump coal is required. Address Pur. Agt. Schumaker, Byrne Bros. Dredging and Engineering Co., Chicago, Ill.

✚1820—Somerset, Penn.—The Town Council will receive bids until 2 p.m., Dec. 28, for furnishing and delivering coal as may be required for the local pumping station and municipal building, during the ensuing year. Mine-run coal is required. Address Secy. C. E. Pile, Town Council, Somerset, Penn. (No. 467, Vol. 7, pp. 628, 750).

1821—Decatur, Ill.—The Staley Manufacturing Co. is receiving bids for furnishing its annual fuel requirements, involving approximately 150 tons of screenings per day. Address Supt. A. E. Chamberlain, Staley Mfg. Co., Decatur, Ill.

✚1822—Williston, N. D.—Bids will be received until 8 p.m., Dec. 31, for furnishing the library building with lignite coal as may be required during the ensuing year. A certified check for $50 must accompany each bid, and the successful bidder will be required to furnish a bond for $200. Address Secy. H. G. Hanson, Library Bd., Williston, N. D.

✚1823—Canton, Ohio—Bids will be received until noon, Dec. 30, for furnishing the local pumping station with No. 8 Pittsburgh nut and slack coal as may be required during the ensuing year. Bids must be made f.o.b. pumping station, and must be accompanied by a certified check for $200. All bids must be submitted on blank forms, which may be obtained on application. Address Dir. Z. W. Kent, Pub. Ser., Canton, Ohio.

1824—St. Louis, Mo.—The St. Louis Smelting and Refining Co. is in the market for its annual fuel requirements at the Collinsville, Ill., plant. About one or two cars per day of mine-run, lump and screenings are needed. Address Secy. J. A. Caselton, St. Louis Smelting and Refining Co., International Life Bldg., St. Louis, Mo. (No. 427, Vol. 7, p. 568).

1825—Willimantic, Conn.—Max Pollock & Co. at this place usually contract for its annual fuel requirements, involving approximately 60 tons per month, some time in February. The company has storage capacity for 400 tons, and deliveries are made by railroad and wagon. Address Purchasing Agent Max Pollock & Co., Willimantic, Conn.

1826—Chicago, Ill.—The Illinois Improvement and Ballast Co. will purchase its requirements, involving five or six cars of Indiana 4th and 5th vein lump, Montgomery and Marion County, Ill., lump per month, in the open market. Address Pur. Agt. C. E. Celes, Illinois Improvement and Ballast Co., 298 S. La Salle St., Chicago, Ill.

1827—Conshohocken, Penn.—The Alan Wood Iron and Steel Co. is in the market for its annual fuel supply, involving approximately 500 tons of broken coal, deliveries to begin Jan. 1. Address Pur. Agt. A. D. Wood, The Alan Wood Iron and Steel Co., Widener Bldg., Philadelphia, Penn.

1828—Kansas City, Mo.—The Ford Laundry Co. at this place has abandoned the use of oil, and will require approximately 100 tons of coal per month. No permanent contract has as yet been negotiated. Adress purchasing Agent The Ford Laundry Co., Kansas City, Mo.

1829—Philadelphia, Penn.—The St. Timothy's Hospital is receiving bids on its annual fuel contract, involving approximately 1,000 tons of pea coal, deliveries to begin Jan. 1. Address Secy. J. V. Merrick, St. Timothy's Hospital, Wissahickon, Philadelphia, Penn.

1830—Ft. Wayne, Ind.—The Evans Coal Co. at this place is in the market for approximately 150 cars of 4-in. or 6-in. Ohio, West Virginia or Kentucky mine-run coal, delivery to be made between Jan. 1 and Apr. 1. Address Purchasing Agent The Evans Coal Co., Ft. Wayne, Ind. (No. 1670, Vol. 8, p. 912).

1831—Philadelphia, Penn.—The Philadelphia Warehouse and Cold Storage Co. is in the market for its annual fuel supply, involving approximately 8,500 tons of buckwheat coal, delivery to be made during the year beginning Jan. 1. Address Secretary Philadelphia Warehouse and Cold Storage Co., Delaware Ave. and Noble St., Philadelphia, Penn.

1832—Wilmington, Del.—The Lobell Car Wheel Co. is in the market for its annual fuel supply, involving approximately 2,000 tons of broken coal per annum, deliveries to be made during the year beginning Jan. 1. Address Purchasing Agent, Lobell Car Wheel Co., Wilmington, Del.

1833—Kansas City, Mo.—The Speth's Domestic Laundry will return to the use of coal on Jan. 1, and will be in the market for tonnage equivalent to 500 bbl. of oil monthly. Address Purchasing Agent Speth's Domestic Laundry, Kansas City, Mo.

1834—Philadelphia, Penn.—The Wabash Mills Co. is conducting a series of tests with a view to substituting anthracite buckwheat coal for bituminous, which they have been using for a number of years past. If satisfactory results are obtained from the tests, about 1,000 tons of coal will be required which will be purchased on a contract, becoming effective Jan. 1. Address Purchasing Agent Wabash Mills Co., Manayunk, Philadelphia, Penn.

✚1835—Philadelphia, Penn.—The City Government will receive bids until Dec. 29 covering its annual fuel requirements during the year beginning Jan. 1. Address Dir. Herman Loeb, Dept. of Supplies, City Hall, Philadelphia, Penn. (No. 22, Vol. 6, p. 933; No. 1516, Vol. 8, pp. 577, 660; No. 1573, Vol. 8, pp. 699, 828; No. 1650, Vol. 8, p. 871).

1836—New Castle, Del.—The American Manganese Steel Co. is in the market for its annual fuel requirements, involving approximately 1,000 tons of broken coal, deliveries to begin Jan. 1. Address Pur. Agt. N. C. Peebles, American Manganese Steel Co., McCormick Bldg., Chicago, Ill.

1837—Philadelphia, Penn.—The Kingan Provision Co., packers, usually contract for its fuel requirements, involving approximately 1,200 tons of anthracite buckwheat coal per annum, about Jan. 1. Address Purchasing Agent Kingan Provision Co., 8th and Willow St., Philadelphia, Penn.

✚1838—Fort Benton, Mont.—The Choteau County Commissioners will receive bids until 10 a.m., Jan. 3, for furnishing coal as may be required at the Court House and Jail during the ensuing year. Address Clk. Lester M. Bond, Bd. of County Comrs., Fort Benton, Mont.

1839—Graniteville, S. C.—The Graniteville Manufacturing Co. usually contracts for its annual fuel requirements, involving approximately 500 tons of Pocahontas mine-run steam coal per month in February. Deliveries are made by railroad, and the company has a storage capacity for 1,500 tons. Address Supt. W. A. Giles, Graniteville Manufacturing Co., Graniteville, S. C.

1840—Philadelphia, Penn.—Hance Bros. & White, manufacturer of drugs, is in the market for its annual fuel supply, involving approximately 1,000 tons of anthracite buckwheat and rice coal. Address Purchasing Agent Hance Bros. & White, Willow and Marshall St., Philadelphia, Penn.

1841—Kansas City, Mo.—The Ideal Laundry at this place has abandoned the use of fuel oil, and will require approximately 100 tons of coal per month. It is understood that there is no permanent contract as yet. Address Purchasing Agent The Ideal Laundry, Kansas City, Mo.

1842—Philadelphia, Penn.—The Niles-Bement-Pond Co., machine manufacturers, will contract for its annual fuel supply, involving approximately 900 tons of steamboat coal, about Jan. 1. Address Purchasing Agent Niles-Bement-Pond Co., Nicetown, Philadelphia, Penn.

1843—Gloucester, N. J.—The Welsbach Co., manufacturer of gas mantles, will contract for its annual fuel requirements, involving approximately 1,000 tons of anthracite broken coal, about Jan. 1. Address Purchasing Agent Welsbach Co., Gloucester, N. J.

1844—Philadelphia, Penn.—Collins & Aikman Co., paper manufacturer, will contract for its annual fuel requirements, involving approximately 1,500 tons of buckwheat coal, about Jan. 1. Address Purchasing Agent Collins & Aikman Co., Manayunk, Philadelphia, Penn.

✚1845—Omaha, Neb.—The City Government will receive bids until 10 a.m., Dec. 28, for furnishing approximately 2,000 tons of Cherokee Kansas nut, 1,000 tons of steam, and several other grades in smaller amounts, deliveries to be made both by wagon and carloads, and to begin Jan. 1. Address City Clk. T. J. O'Connor, Omaha, Neb.

1846—Princeton, Ind.—The Gibson County Commissioners will receive bids until Dec. 27 for furnishing the fuel requirements for the county during the ensuing year. Address Aud. W. T. Roberts, Gibson Co., Princeton, Ind.

1847—Mare Island, Calif.—The Navy Department is in the market for 300 tons of coke for delivery at the Navy Yard at this place. The purchase is being negotiated under schedule No. 9147. Address Paymaster General of the Navy Samuel McGowan, Washington, D. C.

Contracts Awarded

Note—Successful bidders are noted in **bold face** type.

1660—East St. Louis, Ill.—This contract (p. 911), which provides for furnishing the Obear-Nester Glass Co. with its annual fuel requirements, involving a total of about 400 tons per week, has been awarded to the **E. F. Wickham Coal Co.**; the contract for the steam coal, involving about 100 tons per week has been sublet to the **Lenz Coal Co.** The coal for the gas producer, about 300 tons per week, will be supplied from the Wickham mine at Duquoin. Address Supt. Jos. Nester, the Obear-Nester Glass Co., East St. Louis, Ill.

✚1667—Ironton, Ohio—The readvertisement for bids on this contract (pp. 912, 998), which provides for furnishing the coal requirements for the local pumping station during the ensuing year, brought out the following bids: **Andrew Geil**, clean lump, $1.90; lump, nut and pea, $1.70; mine-run, $1.50. Wm. W. Sites, clean lump, $1.84. The contract was awarded to **Andrew Geil** on his bid of $1.70 for lump, nut and pea coal. Address Clk. F. A. Ross, Public Service, Ironton, Ohio.

1668—St. Louis, Mo.—This contract (p. 912), which provides for furnishing the St. Louis Car Co. with approximately 125 tons of nut coal per week, has been awarded to the **Devoy & Kuhn Coal Co.** The contract will expire on Apr. 1. Address Pur. Agt. E. B. Meissner, St. Louis Car Co., St. Louis, Mo.

1691—St. Louis, Mo.—This contract (p. 957), which provides for furnishing the American Paper Products Co. with its annual coal supply, involving approximately 200 tons of 1¼-in. screenings per month, has been awarded to the **Mt. Olive & Staunton Coal Co.** It is understood that an extra supply of storage coal will be furnished to the company under this contract to provide against a suspension of mining operations Apr. 1. Address Pur. Agt. Pollock, American Paper Products Co., St. Louis, Mo.

✚1696—Elmira, N. Y.—This contract (p. 957), which provides for furnishing the local Water Board with approximately 2,000 tons of bituminous mine-run during the ensuing year has been awarded to the **Ralston Coal Co.,** at $2.25 per ton. Address Gen. Mgr. H. M. Beardsley, Water Board, Elmira, N. Y.

1726—Elkhart, Ind.—This contract (p. 999), which provides for furnishing the Elkhart Bristol Board and Paper Co. with approximately 3,500 tons of mine-run coal, has been awarded to the **Wyatt Coal Co.** Address Pres. C. E. Frye, Elkhart Bristol Board and Paper Co., Elkhart, Ind.

1756—Delphos, Ohio—The contract of the Delphos Gas Co. (p. 1043), is covered until Dec. 1, 1917. The contract involves 2,500 tons per annum instead of 600 tons as previously noted. Address Pur. Agt. W. M. Moran, Delphos Gas Co., Delphos, Ohio.

Contract Notes

East St. Louis, Ill.—Carter Brothers have contracted with the **Lumaghi Coal Co.** for 350 tons of "Cantine" 6-in. lump per month.

St. Louis, Mo.—The Thos. Ryan Coal Co. has contracted with the Southern Coal, Coke and Mining Co. for a tonnage of New Baden lump coal.

St. Louis, Mo.—The Weisenborn Coal Co. has awarded the **Searles Coal Co.** a contract covering its requirements of Illinois high grade McClintock coal.

Belleville, Ill.—The Belleville coal dealers have announced that no more coal will be sold on credit, due to the heavy losses that have been sustained from this cause.

St. Louis, Mo.—The Missouri Can Co. have contracted with the **Taylor Coal Co.** for 250 tons of "Energy" screenings per month. Address Pur. Agt. F. M. Payne, The Missouri Can Co., St. Louis, Mo.

St. Louis, Mo.—The Vanadlia R.R. Co. has begun storing 20,000 tons of lump coal at the Rose Lake yard in East St. Louis. The coal is being furnished by the **Lumaghi Coal Co.,** and the **Consolidated Coal Co.**

Chester, Penn.—The Keystone Plaster Co., at this place is experimenting with fuel oil and if successful they will discontinue the use of anthracite coal. Address Pur. Agt. Keystone Plaster Co., Chester, Penn.

Charleston, W. Va.—Press reports state that the Imperial Coal and Coke Co. and the Christian Colliery Co. have closed a contract with a Middle Western manufacturing concern, involving 120,000 tons, deliveries to be made during the year beginning Apr. 1.

Cincinnati, Ohio—The Peters Cartridge Co. has contracted with the **Wyatt Coal Co.** for 5,000 tons of West Virginia egg coal for delivery at the Kings Mill plant during the ensuing year. Address Pur. Agt. G. W. Collins, Peters Cartridge Co., Cincinnati, Ohio.

Granite City, Ill.—The contract of the National Stamping and Enameling Co., will be filled on 2 in. screenings instead of 1½ in. as previously announced (p. 959). Address Pur. Agt. R. C. Lutton, National Enameling and Stamping Co., Granite City, Ill.

Louisville, Ky.—The contract of the Louisville Ry. Co. (p. 1,045), involving over 100,000 tons of pea and slack coal per annum, does not expire until March, 1917. Address Supt. of Motive Power, F. H. Miller, Louisville Ry. Co., 326 W. Jefferson St., Louisville, Ky.

Harrisburg, Ill.—The Southern Illinois Railway and Power Co. consumes approximately 10,000 tons of special nut coal per annum. The company has a six-year contract and deliveries are made daily over their own lines. Address Pur. Agt. C. F. Richardson, Southern Illinois R.R. and Power Co., Harrisburg, Ill.

Baltimore, Md.—Press reports are to the effect that the Elkhorn Coal Corporation has concluded a deal with the United States Steel Corporation involving between 5,000,000 and 7,000,000 tons of coal for the steel company's plant at Gary, Ind. Deliveries are to be made during the next three years or more.

St. Louis, Mo.—The contract for furnishing the New Standard Adding Machine Co. with approximately 100 tons of coal per month has been awarded to the **Polar Wave Ice and Fuel Co.** on Standard 2 in. lump coal. Deliveries are made by wagon. Address Pur. Agt. J. M. Anderson, New Standard Adding Machine Co., St. Louis, Mo.

Selma, Ala.—The Selma Lighting Co. consumes approximately 6,000 tons of nut and slack and 3,000 tons of No. 2 in. lump coal per annum, deliveries being made by railroad at the rate of about 700 tons per month. The company has storage capacity for 1,500 tons. Address Pur. Agt. R. L. Ellis, Selma Lighting Co., Selma, Ala.

Moncton, N. B., Can.—The Moncton Tram Electric and Gas Co. consumes about 7,500 tons of screened nut coal per annum, deliveries being made by railroad at the rate of approximately 600 tons per month. Purchases are confined to the open market and the company has a storage capacity of 1,000 tons. Address Pur. Agt. A. B. Coryell, Moncton Tram Electric and Gas Co., Box 23, Moncton, N. B., Can.

Eagle Pass, Tex.—The Olmos Coal Co., has received a number of large orders for coal to be delivered in various parts of Mexico. Deliveries have recently been impossible due to the revolution but conditions are now being rapidly restored to normal. It is understood that the company has orders for at least 50,000 tons. The Carranza Government has announced that no import duty will be charged on coal.